SYSTRON DONNER

A THORN EMI company

[redacted]

SYSTRON DONNER
Member THORN EMI Group

MODEL VPH5-60 S6539A

INSTRUMENT DIVISION

OPERATING AND SERVICE MANUAL

The Model VPH5-60 S6539A Power Supply is similar to the VPH5-60MOV as described in the enclosed manual with Special Modification S6539A added.

Special Modification S6539A consist of:

1. Input volts to 208,220,230 and 235 Vac ±10% @50/60 Hz.
2. Temperature Range: 25-50° C.
3. Output Volts: 4.75 to 5.5V. Set to 5.0V.
4. Output Amps: 60A
5. Overload Protection: 69A ±1A
6. Seet Parts Lists 065114-91.
7. See Schematic D124150 for circuit description.

2727 Systron Drive • Concord, California 94518 • U.S.A.
Tel: (415) 676-5000 • TWX: 910-481-9479 • Cable: SYSTRON DONNER
FSCM No. 52542

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SYSTRON DONNER CORPORATION

ADDENDUM

MODEL VPH5-60 S6539A

The Model VPH5-60 S6539A Power Supply is similar to the VPH5-60MOV as described in the enclosed manual with Special Modification S6539A added.

Special Modification S6539A consist of:

1. Input volts to 208,220,230 and 235 Vac ±10% @50/60 Hz.
2. Temperature Range: 25-50°C.
3. Output Volts: 4.75 to 5.5V. Set to 5.0V.
4. Output Amps: 60A.
5. Overload Protection: 69A±1A.
6. See Parts Lists #065114-91.
7. See Schematic #D124150 for circuit description.

**- REF DWG NOS FOR VPH5-60-S6539A

*- INDICATES DEVIATION FROM STANDARD VPH5-60 MOV

ITEM NO.	SIZE	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
1		065114	SHIPPING ASS'Y		X	2		
5D		124150	SCHEMATIC, OV		REF	-		
6A		1269	SPECIAL TEST DATA					
7A		1301	" " "					
9B		PD27841	ASS'Y., TOP COVER & LABEL	** PD27880	1	2		
10D		065613	COVER, FINISHED		1	2		
11A		065148	AC - COVER		1	2		
12								
13			NAMEPLATE	069003	1	R		
14		T970160	6-32 X 1" B.H. SCREW		2	R		
15		840405	PLUG BUTTON		1	R		
16					1	1		
17B		PD27347	ASS'Y., CHASSIS #1	**- PD27877	1	2		
18D		065608	CHASSIS, FINISHED		1	2		
21		840192	FEET, RUBBER		4	1		
22		T971020	1/4-20 X 1 1/4 HEX BOLT		2	1		
23		820371	CAPACITOR, 25000MF, 25V	C105, 106, 108	3	1		
25		820274	↓ , 6000MF, 40V	C107	1	1		
27		106664	FAN	B101	1	1		
29		106879	CLAMP, CAPACITOR		1	1		
31		100725			1	1		
33B		065612			1	2		

REVISIONS
REV | DESCRIPTION
D | SEE ECO 15736 -19 80

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDENT
				52542

PLANNER | PREP DATE 10-28-15 | SYSTRON DONNER CORPORATION
CHK'D
MAT. DUE | APP'D
B/O REQ.
B/O COMP | USED ON

SHIPPING ASS'Y
VPH 5.2-50 MOVS6539
VPH5-60 MOVS6539A

DRAWING NO.
REF | SIZE | P | 065114 | REV B
SHEET 1 OF 2

** - REF. DWG'S FOR VPH5-60-56539A
* - INDICATES DEVIATION FROM STANDARD VPH5-60-MOV

ITEM NO.	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY.	ACT. STOCK QTY.	ISS. QTY.	SHIP QTY.
	PD27347	ASS'Y CHASSIS #1 (CONT.)**	PD27877	-	-		
35C	065609	BKT. MTG. XFMR & CHOKE		1	2		
36							
37	T910110	GROMMET		1	R		
38	T910010	"		1	R		
39	PD25173	HEATSINK ASS'Y #2		1	2		
40	118982	HEATSINK ADDITION #1		1	2		
41	705071	TRANSISTOR	Q101 Q102	2	1		
42	700196	"	Q103	1	1		
43	830101	" SOCKET		2	1		
44	830103	" "		1	1		
45	T990290	MICA WASHER		2	R		
46	T990285	" "		1	R		
47	859019	TERMINAL STRIP		1	1		
49	119112	PLATE FAN RIGHT		1	2		
50	119122	" " LEFT		1	2		
51	T950174	INSULATION RUBBER		1	R		
52A	PD27346	REAR PANEL ASS'Y		1	2		
* 53C	069051	REAR PANEL		1	2		
* 54	069116	AC DIAL PLATE		1	2		
55	117377	FUSE HOLDER		2	1		
* 56	870197	FUSE 8A 250V	F1 F2	2	1		
* 57	780692	FUSE LABEL 8AMP S.B.		1	1		
58	850150	BARRIER STRIP	TB1	1	1		
59	118242	BLOCK, INSULATOR	TB2	1	2		
60	850052	BARRIER STRIP	TB3	1	1		
61	840217	" " LINKS		3	1		
62	100827	HEX SPACERS 5/16 Lg		2	1		
* 63	069115	AC INPUT FOILCAL		1	1		
64B	PD25010	ASS'Y, CHASSIS # 2		1	2		
* 65	504291	TRANSFORMER	T101	1	2		

525-42

SHIPPING ASS'Y
VPH 5.2-50-56539
VPH5-60-56539A

**-REF. DWG NOS FOR VPH5-60-56539A ☆-SEE PAGE 8

*-INDICATES DEVIATION FROM STANDARD VPH5-60-MOV

ITEM NO.	SIZE	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
		PD25010 (CONT)	ASSLY, CHASSIS #2		X	-		
67		···504125	CHOKE	L101	1	2		
68	B	118222	BAR, BUSS, POS. OUTPUT		1	2		
69	C	118232	↓ ↓ NEG. ↓		1	2		
70	B	118292	SHUNT	R117	1	2		
71		T990450	P.C. SUPPORT		2	1		
72	A	PD25009	ASSLY, FRONT PANEL		1	2		
73	C	118284	FRONT PANEL, FIN.		1	2		
74		06516701	METER 0-100A-Assly	M101	R	R		
75		06516902	—"— 0-8V-Assly	M102	R	R		
76		116669	SWITCH	S101	1	1		
77		770090	L.E.D.	DS101	1	1		
78		600140	RES., V ADJ. 500-2W	R116	1	1		
79		085420	OUTPUT LABEL	PD27772	1	1		
80		840220	SHAFTLOCK		1	1		
81	A	PD25175	HEAT SINK ASSY & WIRING		1	2		
82		118992	HEAT SINK ADDITION		1	2		
83	B	PD25008	HEAT SINK ASSLY & WIRING		1	2		
84		640190	RES. 10Ω 2W	R115	1	1		
85		640011	↓ .1Ω 5W	R104 - R113	10	1		
87	B	PD27345	ASSLY, HEATSINK O.V.	**-PD27875	1	2		
88		T115802	HEAT SINK, FAB		1	2		
89		065444	BRKT, PC SUPPORT		2	2		
90		118602	BAR, BUSS, EMITTER		1	2		
91		T990415	NUT, PUSH, NYLON		3	R		
92		T990405	↓ ↓ ↓		2	R		
93		T990450	P.C. SUPPORT		2	1		
94								

REVISIONS
REV | DESCRIPTION
A1 | SEE TCO T116 8-19-80

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDENT
				52542

PLANNER | PREP DATE | CHK'D | APP'D | MAT. DUE | B/U REQ. | B/U COMP

SYSTRON DONNER CORPORATION

SHIPPING ASSLY
VPH5.2-50MOV56539
VPH5-60MOV56539A

DRAWING NO.

REF	SIZE	PART NO.	REV
—	P	065114	A1

USED ON

SHEET 3 OF 8

**. REF. DWG. NO'S FOR VPH5-60-36539A

*. INDICATES DEVIATION FROM STANDARD VPH5-60-MOV

ITEM NO.	SIZE	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
		PD27345 (CONT)	ASS'Y, HEATSINK	**-PD27875-	-	-		
99		T960347	RIVET		4	R		
*101		700088	TRANSISTOR, 2N3771	Q104-113	10	1		
103		720132	DIODE	CR108	1	1		
105		720129	↓	CR107	1	1		
107		720330	70H10A	CR103 & 104	2	1		
109		830101	SOCKET, TRANSISTOR		10	1		
111		T990350	RING, INSULATOR		1	R		
113		T990307	WASHER, MICA		2	R		
115		T960085	LUG, SOLDER		1	R		
117		880003	SWITCH, THERMAL	S102	1	1		
119								
121		720008	DIODE - SCR	CR106	1	1		
123		T990340	RING, INSULATOR		3	R		
125		T990295	WASHER, MICA		2	R		
127		T960640	LUG		1	R		
129A		065614	BAFFLE		1	2		

REVISIONS
REV. DESCRIPTION

MODEL | DWG NO | LOT QTY | LOT NO | CODE IDENT 52542

PLANNER | PREP DATE 10-23-75 | CHK'D | APP'D | MAT'L DUE | BILL REQ | BILL COMP | USED ON

SYSTRON DONNER CORPORATION

SHIPPING ASS'Y
VPH5-2-50 MOV S6539
VPH5-60 MOV S6539A

PART NO. | REF | SIZE | PART NO. | REV
— | P | 065414

SHEET 4 OF 8

ITEM NO.	SIZE	PART NUMBER	DESCRIPTION	REFERENCE NO	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
		PD25010 (CONT)	ASS'Y., CHASSIS #2		—	—		
131	B	122852	STRIP, OUTPUT HOLDING		1	2		
133	C	PD25006	ASS'Y., COMP. BD.		1	2		
135	D	T112256	FAB., P.C.B		1	2		
136	D		ARTWORK	112256	REF	—		
137		T960464	TERMINAL		16	R		
138		543131	↓ RIGHT ANGLE		16	R		
141		102598	CAPACITOR, 100MF, 50V	C1	1	1		
143		800090	.01MF, 600V	C3	2	1		
144		800002	470PF, ↓	C4	1	1		
145		810060	35MF, 25V	C5	2	1		
146			S/AC5	C6				
147		100134	.05MF, 200V	C7	1	1		
148			S/AC3	C8				
149		100178	.1MF, 100V	C9	1	1		
151		821006	68MF, 15V	C11	1	1		
152		100063	10MF 25V	C12	1	1		
153		810161	200MF ↓	C13	1	1		
155		100413	DIODE, IN4004	CR1	2	1		
156			S/A CR1	CR2				
157		720410	IN4741A	CR3	1	1		
158		100387	IN753A	CR4	1	1		
159		720167	IN5221B	CR5	1	1		
160		100413	IN5395	CR6	4	1		
161			S/A CR6	CR7				

MODEL	JOB NO.	QUANTITY	LOT NO	CODE IDENT 52542
PLANNER	PREP DATE	SYSTRON DONNER CORPORATION		
MAT. DUE	APPD	SHIPPING ASS'Y VPH5.2-50 MOVS6539 VPH5-60 MOVS65394		
B/U REQ.		DRAWING NO.		
B/U COMP	USED ON	REF — SIZE P PART NO. 065114 REV		
		SHEET 5 OF 8		

ITEM NO.	SIZE	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT CODE	ISS. QTY	SHT QTY
		PD25006 (CONT)	ASS'Y., COMP. B D.		-			
163		100415	DIODE, IN746 A	CR8	1	1		
164		741001	UN-SW 2N4990	CR9	1	1		
166		720440	IN4148	CR11	1	1		
167			S/A CR6	CR12				
168			↓ ↓	CR13				
170		025756	I C.	A1	1	1		
172		106587	TRANSISTOR, 2N2219A	Q1	1	1		
174		640390	RESISTOR, 220Ω, 2W, 10%	R1	1	1		
175								
176		600207	POT, 2K, ½W, 20%	R3	1	1		
177		620436	2.26K, ½W, 1%	R4	1	1		
178		620488	3.4K,	R5	1	1		
179		620534	4.64K,	R6	1	1		
180		620402	1.96K,	R7	1	1		
181		106012	2.2Ω, 10%	R8	2	1		
184		117188	POT, 100Ω ½W, 20%	R11	4	1		
185		101474	330Ω, ½W, 10%	R12	2	1		
186			S/A R12	R13				
187			↓ R8	R14				
188		640434	400Ω, 5W, 5%	R15	1	1		
189			S/A R11	R16				
190		640182	7.5Ω, 10W	R17	2	1		
191			S/A R17	R18				
192		640250	20Ω, 5W, 5%	R19	1	1		
193		640140	3.3Ω, 2W, 10%	R20	1	1		

CODE IDENT 52542

PLANNER REP DATE

SYSTRON DONNER CORPORATION

MAT. DUE

SHIPPING ASS'Y
VPH5.2-50MOVS6539
VPH5-60 MOVS6539A

P 065114

SHEET 6 OF 8

**-REF. DESIGNATION FOR WIRED ASSY.

ITEM NO.	SIZE	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
		PD25006 (CONT)	ASS'Y., COMP. BD.					
94			RESISTOR, S/A R11	R21				
95		101459	1.5K, 1/2W, 10%	R22	1	1		
96		101467	1K, ↓ ↓	R23	2	1		
97			S/A R11	R24				
98		640380	150Ω, 2W, 10%	R25	1	1		
99		611100	2.2 MEGΩ 1/2W	R26	1	1		
100		101511	4.7K, 1/2W, 10%	R27	2	1		
101		101510	6.8K, ↓ ↓	R28	1	1		
102			S/A R23	R29				
103		101667	220Ω, 1/2W, 10%	R30	1	1		
104			S/A R27	R31				
105		101454	2.2KΩ 1/2W 1%	R32	1	1		
106		840422	PAD, IC		1	R		
107		840411	, TRANSISTOR		1	R		
108		840420	, ↓		1	R		
110		PD25174	H. SINK #2 ASSLY + WIRING		1	2		
111		640020	RESISTOR .2Ω 3W 10%	R101, R102	2	1		
112		101467	1K 1/2W 10%	R103	1	1		
113		101498	100Ω 1/2W 10%	R114	1	1		
115		PD27349	WIRING T101-L101	**-PD27879	1	2		
116		800185	CAP. .1μF 250V	C101, C102	2	1		
117		800304	1.0μF 250V	C103, C104	2	1		
118		710454	DIODE 1N5401	CR101	2	1		
119			S/A CR101	CR102				

MODEL	JOB NO.		IDENT 52542
PLANNER	PREP DATE	SYSTRON DONNER CORPORATION	
MAT. DUE	APP'D	SHIPPING ASS'Y VPH5.2-50 MOVS6539 VPH5-60 MOVS6539A	
B/O REQ.		DRAWING NO.	REV
B/O COMP.	ISSUED	P 065114	
		SHEET 7 OF 8	

DESCRIPTION REV

**-REF. DWG. NO'S FOR VPH5-60-S6539A

ITEM NO	SIZE	PART NUMBER	DESCRIPTION	REFERENCE NO	ASSY QTY	ACT CODE	ISS QTY	SHT QTY
		065114 (CONT)	SHIPPING ASSLY		-	-		
227		T942306	HARNESS AC/DC		1	2		
228		PD27343	WIRE LIST	**PD27874				
229		VPH-1	HARNESS LAYOUT					
230								
231		T942416	HARNESS DC		1	2		
232		PD27091	WIRE LIST (VPH-2)					
233								
235		PD27350	WIRE LIST - JUMPERS	**PD27882	1	2		
236								
237								
238								
239A		PD27348	WIRING REAR CHAS	**PD27876	1	R		
240A		PD25003	WIRING - PC BRD		1	R		
241A		PD25012	WIRING - FR. PANEL		1	R		
245B			WIRING - CHASSIS	PD25011	1	R		
☆ 246A		065167-01	METER ASS'y 0-100A	M101	1	2		
247D		065160	METER MOVEMENT 1MA 77Ω		1	1		
248		117397	BLANK DIAL	B065167	1	1		
☆ 249B		065169-02	METER ASS'y - 0-8V	M102	1	2		
250D		065160	METER MOVEMENT 1MA 77Ω		1	1		
251		117397	BLANK DIAL	B065169	1	1		
252B		065049	P.C. BOARD (METER CAL.)		1	1		
253		102181	POT 1KΩ	R401	1	1		
254		102278	RES. 7.50KΩ	R402	1	1		

REVISIONS
REV DESCRIPTION

52A2

SHIPPING ASSLY
VPH 5.2-50 MOVS6539
VPH 5-60 MOVS6539A

P 065114
SHEET 8 OF 8

B	REDRAWN FROM E SIZE.				
C	CR103 & CR104 WAS P/N 720488			6-4-75	RJB
D	CHANGED S101 TO A DPST, REMOVED CONNECTIONS FROM TB101 TERMINALS 4,56		TCO 116	7/80	RJB

NOTES

1. UNLESS OTHERWISE SPECIFIED:
   ALL RESISTORS ARE 1/2W, ± 5%.
   RESISTANCE VALUES ARE EXPRESSED IN OHMS.
   CAPACITANCE VALUES ARE EXPRESSED IN MICROFARADS
2. ALL MODELS ARE SHOWN WITH OVER VOLTAGE PROTECTION.
   TO DELETE, OMIT CR104, R19 THRU R23, C7 & C9, CR8 & CR9.
3. * DENOTES SELECT AT TEST.
4. LAST REFERENCE DESIGNAT ONS USED ARE :
   R32 (ON CKT. BOARD). (R31 R33, R10 NOT USED..
   R117 (ON POWER CIRCUIT)
   C13 (ON CKT BOARD). (C11 NOT USED,.
   C108 (ON POWER CIRCUIT)
   CR13 (ON CKT. BOARD).
   CR108 (ON POWER CIRCUIT) (CR105 NOT USED).
   Q113 (ON POWER CIRCUIT).
   A1 (ON CKT. BOARD)
5.

MODEL	Q104-Q113	M101
VPH5.2-30 S6489	700440	50A
VPH5.2-50 S6539	700883	50A
VPH5-60 S6539A	700888	100A

PASS TRANSISTORS

Q104 R104 0.1,5W
Q105 R105
THRU THRU
Q112 R112
Q113 R113 0.1,5W
R115 10,2W
CR108 IN1200A

INPUT 208 TO 235 VAC ±10% 50/60 HZ

TB101 F1 (SLO-BLO) 8A,250V
AC COM
S101
B101
208V 220V 230V 235V
T101 504291
C101 0.1,250V
CR101 IN5401
C102 0.1,250V
CR102 IN5401
C107 6000 40V
CR103 7AMP/CA
C103 1.0 250V
CR104 7AMP/CA
C104 1.0 250V
C105 25000 25V
C106 25000 25V
L101 504125

Q101 705071 R101 0.2, 3W
Q102 705071 R102 0.2, 3W
Q103 700196 R103 1K R114 100

S102 380003 PROTECTIVE THERMAL SWITCH 115°C

CIRCUIT BOARD

CR1 IN4004
CR2 IN4004
R1 220,2W
CR3 IN4741A 11V
C8 .01 600V
A1 MA723C
C1 100 50V
R31 4.7K
CR4 IN753A 6.2V
R26* 2.2M
CR11 IN4148
R3 2000, 20% CW
R4 2.26K, 1%
R32 2.2K
C12 1KV 25V
R6 4.64K, 1%
7.15V
2.2V
R7 1.96K 1%
CR6 IN4384
R33 150, 2W
C5 35, 25V
C4 470PF
R8 2.2
C11 68-15V
R28 6.8K
C3 .01 600V
R29 1K
R27 4.7K
CR12 IN 4384
CR13 IN4384
C13 200 25V
R14 2.2
R16 100, 20% CW
R11 100, 20% CW CURRENT LIMIT ADJ.
R12 * 330
R30 220
Q1 2N2219A
CR5 IN52218 2.4V
R13 330
R18 7.5 10W
R19 20,5W
R17 7.5 10W
R20 3.3 2W
R22 1.5K
CR8 IN746A 3.3V
CR9 2N4990
C7 .05 200V
R23 1K
C9 0.1 100V
R21 100 20% CW
CR7 IN4384
C6 35, 25V
R116 500 CW VOLTAGE ADJUST
LED DS101 DC ON

R117 0.0012 AMMETER SHUNT
R24 100 20% CW
R15 400 3W
M101
CR106 C228F
CR107 IN1199A
C108 25000 25V

TB102 +V -V

TB103 -V -S RVD -S -V

M1C2 R25 2.5K R26 1K 8V

PROPRIETARY DATA	BYSTRON DONNER CORPORATION CONCORD CALIFORNIA
	CODE IDENT 52542

SCHEMATIC
VPH5.2-30 S6489
VPH5.2-50 S6539
VPH5-60 S6539A

DRAWING NO. D 124150 REV D

SYSTRON DONNER
Member THORN EMI Group

VPH SERIES
VALUE POWER HALF RACK POWER SUPPLIES
VPH 28-19

INSTRUMENT DIVISION

OPERATING AND SERVICE MANUAL

2727 Systron Drive • Concord, California 94518 • U.S.A.
Tel: (415) 676-5000 • TWX: 910-481-9479 • Cable: SYSTRON DONNER
FSCM No. 52542

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SYSTRON DONNER
INSTRUMENT DIVISION
2727 Systron Drive
Concord, California 94518

WARRANTY POLICY

I Warranty

Systron Donner Instrument Division warrants that at the time of shipment the products manufactured by Systron Donner and sold hereunder will be free from defects in material and workmanship and will conform to the current specifications published by Systron Donner's Instrument Division.

II Warranty

A The warranty period will be one year from the date of shipment. This warranty is extended only to the original buyer.

III Warranty Adjustments

A. If any defect within this warranty appears, Purchaser shall notify Seller immediately.

B Systron Donner agrees to repair or furnish a replacement for, but not install, any product which within the standard warranty shall, upon test and examination by Systron Donner, prove defective within the above warranty period.

C No product will be accepted for return or replacement without prior approval of Systron Donner. Upon such authorization and in accordance with instructions of Systron Donner, the product will be returned to the manufacturing location, shipping charges prepaid by Purchaser.

IV Exclusions from Warranty

A The foregoing warranty is in lieu of and excludes all other expressed or implied warranties of merchantability or fitness or otherwise.

B Systron Donner will not be liable for any special or consequential damages or for loss, damages or expense directly or indirectly arising from the use of the products, or any inability to use them either separately or in combination with any other equipment or material, or from any other cause.

C The warranty does not extend to any product manufactured by Systron Donner which has been subjected to misuse, neglect, accident, improper installation or to use in violation of instructions furnished by Systron Donner.

D The warranty does not extend to or apply to any unit which has been repaired or altered at any place other than Systron Donner; by persons not expressly approved by Systron Donner; not to any unit, the serial number of which has been removed or defaced or Changed.

E This warranty applies to new equipment only and will cover repaired or replacement items only to the extent of the balance remaining of the items original warranty period noted in Paragraph II.

F All freight charges will be paid for by the Purchaser.

June, 1985

SYSTRON DONNER
Member THORN EMI Group

INSTRUMENT
DIVISION

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TABLE OF CONTENTS

SECTION			PAGE
1	DESCRIPTION		
	1.1	Introduction	1-1
	1.2	Description	1-1
	1.3	General Features	1-1
	1.3.1	Constant Voltage Model	1-2
	1.3.2	Automatic Foldback Current Limiting	1-2
	1.3.3	Remote Programming	1-2
	1.3.4	Adjustable Overvoltage Protection	1-2
	1.4	Precautionary Measures	1-2
	1.4.1	Wire Size	1-2
	1.4.2	Terminal Post Resistance	1-2
	1.5	Specifications	1-3
2	INSTALLATION AND OPERATION		
	2.1	Mechanical Installation	2-1
	2.2	Electrical Connections	2-1
	2.3	Operating Configurations	2-1
	2.4	Controls	2-2
	2.5	Operation	2-4
3	THEORY OF OPERATION		
	3.1	General	3-1
4	CALIBRATION AND MAINTENANCE		
	4.1	General	4-1
	4.2	Test Equipment Required	4-1
	4.3	Calibration Procedure	4-1
	4.4	Maintenance	4-3

LIST OF FIGURES

Figure	2-1	Local Programming/Local Sensing	2-3
	2-2	Remote Programming	2-3
	2-3	Remote Sensing	2-3
	3-1	Block Diagram	3-2
	4-1	Test Equipment Set-up	4-4

LIST OF TABLES

Table	1-1	Specifications	1-3

SECTION I
DESCRIPTION

1.1 INTRODUCTION

The ValuPower Half Rack (VPH) Series Power Supplies are flexible and dependable sources of DC power, which can be used to meet a variety of needs. These needs may range in scope from inspection and production testing, to laboratory bench testing, IC and system applications.

The voltage adjustment range makes these units well suited for specific systems applications. The ability to provide power packaged in minimum space with high reliability and performance meets the demands of most systems requirements.

This instruction manual provides general characteristics and specifications, operating procedures, theory of operation, calibration and maintenance, parts lists and related schematics for the ValuPower Half Rack series Power Supplies Models, VPH5-60M OV, VPH12-35M OV, VPH15-31M OV, VPH24-22M OV, VPH28-19M OV and VPHD15-13M OV.

1.2 DESCRIPTION

The VPH Series is a unique innovation in DC power supply technology. It provides high power output with excellent regulation, low ripple, fast response and low output impedance for powering and protecting sensitive IC's and systems.

The VPH Series units are available in five slot range outputs and one dual output model (VPHD15-13M OV) providing ±11.5 to 15.5 Vdc at 13 amps. All units are half rack, 5-1/4" high for bench or rack mounting with suitable adapters.

This series is multi-versatile for use in either multiple output power systems or in lab applications with optional meters and controls.

For multiple output power applications, the VPH Series is compatible with Trygon's RM521 and RAH-2B rack adapters. These rack confiugrations afford the user the opportunity to mix and match smaller units with different ratings providing a complete system power supply with multiple outputs for various power requirements.

1.3 GENERAL FEATURES

This series features UL Design, low noise for IC and Systems applications, extremely low output impedance, unique self-test output indicator lamp, adjustable current limiting, remote sensing and programming, overvoltage protection, no turn on/turn off transients, positive convection cooling and versatile rack and bench mounting capability for multiple output power. Output, sensing and remote programming terminals are located on the rear panel of the unit. The AC power switch, DC "ON" lamp, voltage control, and appropriate optional metering devices are all located on the front panel.

1.3.1 Constant Voltage Model

A constant voltage is maintained across the output terminals at any preset value within the rated slot voltage range, provided that the load does not draw more than either the rated output current or more than the preset limiting current value determined by the top recessed current control setting.

1.3.2 Automatic Foldback Current Limiting

Short circuit protection is provided by the automatic current limiting circuit which limits the maximum output current under all load conditions. The point at which automatic current limiting occurs is variable and may be selected anywhere between 40% of the rated output current and maximum rated output current of the unit. In the event of an overload, the current and voltage foldback into a safe operating region. In the event of a short circuit, the output current is limited to approximately 40% of the rated current.

1.3.3 Remote Programming

Remote Programming is provided in the voltage mode of operation and may be utilized over the entire voltage range of the unit. The scale factor for remote voltage programming is approximately 500 ohms per volt.

1.3.4 Adjustable Overvoltage Protection

Adjustable overvoltage protection (OV) has a special circuitry which prevents the output from exceeding a preset voltage. An external adjustment control recessed in the top cover is provided to vary the point at which the OV circuit will activate. The overvoltage crowbar will latch when an overvoltage condition occurs and must be reset by cycling the AC input power off and on again. The OV protection point should not be set lower than 1 volt above the minimum power supply voltage rating or 5.5 V minimum.

1.4 PRECAUTIONARY MEASURES

1.4.1 Wire Size

To assure proper regulation under all load conditions and to prevent severe distortions of the AC line voltage, it is very important to take into consideration the physical size and current handling capabilities of the input power line. Serious losses in regulation and an increase in ripple may result from underrated or overloaded AC input lines. The maximum AC impedance from the breaker box to the power supply should not exceed 0.5 ohms.

1.4.2 Terminal Post Resistance

All terminals and shorting links serving outputs, sensing and programming must be securely tightened before use. Serious loss of regulation and an increase in ripple can result due to a voltage drop caused by loose terminals and shorting links.

The specifications cited herein for regulation and ripple can be readily attained on every power supply providing the proper method of measurement is employed. The major consideration is that the highly stable meter and oscilloscope, specified in the calibration procedures, must be connected to the sensing terminals and not the load terminals. The reason for this precaution is that the voltage drop between the load terminals and sensing terminals will yeild an inaccurate regulation ripple measurement.

1.5 SPECIFICATIONS

Table 1-1 is a complete list of standard specifications for the ValuPower Half Rack Power Supplies.

TABLE 1-1 SPECIFICATIONS

ELECTRICAL SPECIFICATIONS

Input:	105-132 Vac[1], 57-65 Hz. (200-250 Vac, 47-65 Hz option available)[2].
Output:	Floating; Isolated from ground, 300 Vdc maximum. Internal protection is provided for applied reverse voltage.
Regulation Line:	0.02% for 105-132 Vac line change.
Regulation Load:	0.02% or 5 mV* for no load to full load.
Ripple:	Less than 1 mV RMS; total ripple and noise less than 5 mV p-p +0.05%(to 10 MHz).
Stability:	0.05% +10 mV, for 8 hours after 30 minutes warm-up. Measured at constant line, load and ambient temperature.
Temperature Coefficient (Per°C):	0.02%/°C.
Temperature Range:	-20°C to +71°C.
Temperature Storage:	-55°C to +85°C.
Recovery Time:	50 microseconds to within 30 mV for a Δ1 change as shown in the table.
High Stability (X Option):	0.03%/8 hours. 0.1%/1000 hours. TC 0.01%/°C.
Overload Protection:	A unique patented automatic non-linear current foldback system is incorporated in these units. It is adjustable from 40% to 100% of rated load and affords maximum protection of the series pass regulator while providing maximum reliability should an overload condition occur. (A minimum short circuit current of 10% will be delivered into any class of load, ensuring proper operation with most non-linear loads).

TABLE 1-1 SPECIFICATIONS (Cont'd)

ELECTRICAL SPECIFICATIONS (Cont'd)	
AC Power Input Protection:	Rear panel mounted fuse.
Remote Programming:	Programmable over rated voltage range. Scale factor approximately 500 ohms/volt.
Remote Sensing:	Maintains rated regulation directly at the load. Maximum line drop 0.5 V per leg is included in voltage range. Internal protection is supplied for open sensing leads.
Voltage Adjustment Range:	Continuously adjustable over rated voltage range. Resolution and settability 0.1%.
UL Approval:	Designed to meet UL Recognized Component Index requirement.
GENERAL & PHYSICAL SPECIFICATIONS	
Design Principle:	Prescision Series Pass Regulation.
Operational Modes:	Constant Voltage with Automatic Current Foldback Protection.
Controls:	
Voltage:	Continuous voltage adjustment, front panel screwdriver locking adjust.
Current:	Top recessed adjustment, 40% to 100%.
Input Power:	Front panel AC ON switch (optional)[3].
Output Power:	Front panel DC output indicator.
OV Adjust:	Top recessed adjustment potentiometer.
Metering (Option)[3]:	
Voltage:	Front panel Voltmeter (meter accuracy ±2%).
Current:	Front panel ammeter (meter accuracy ±2%).
Rear Panel Power Output Terminals:	(TB-3) 1/4-20 heavy duty terminals for +V and -V.
Rear Panel Barrier Strip:	(TB-1) (1) AC; (2) Ground G; (3) AC. (TB (TB-4) (1) Negative Output -V; (2) Negative Sensing -S; (3) Remote Voltage Programming RVP: (4) Positive Sensing +S; (5) Positive Output +V.
Systems Rack Mounting Capability:	VPH units without meters can be mounted in Rack Models RPS-8B, RAH-2B or RQH-3B racks for multiple output power are used where meter option is requested. Rack Model RM521 is used for multiple output systems applications where meters and controls are required, external to the unit.

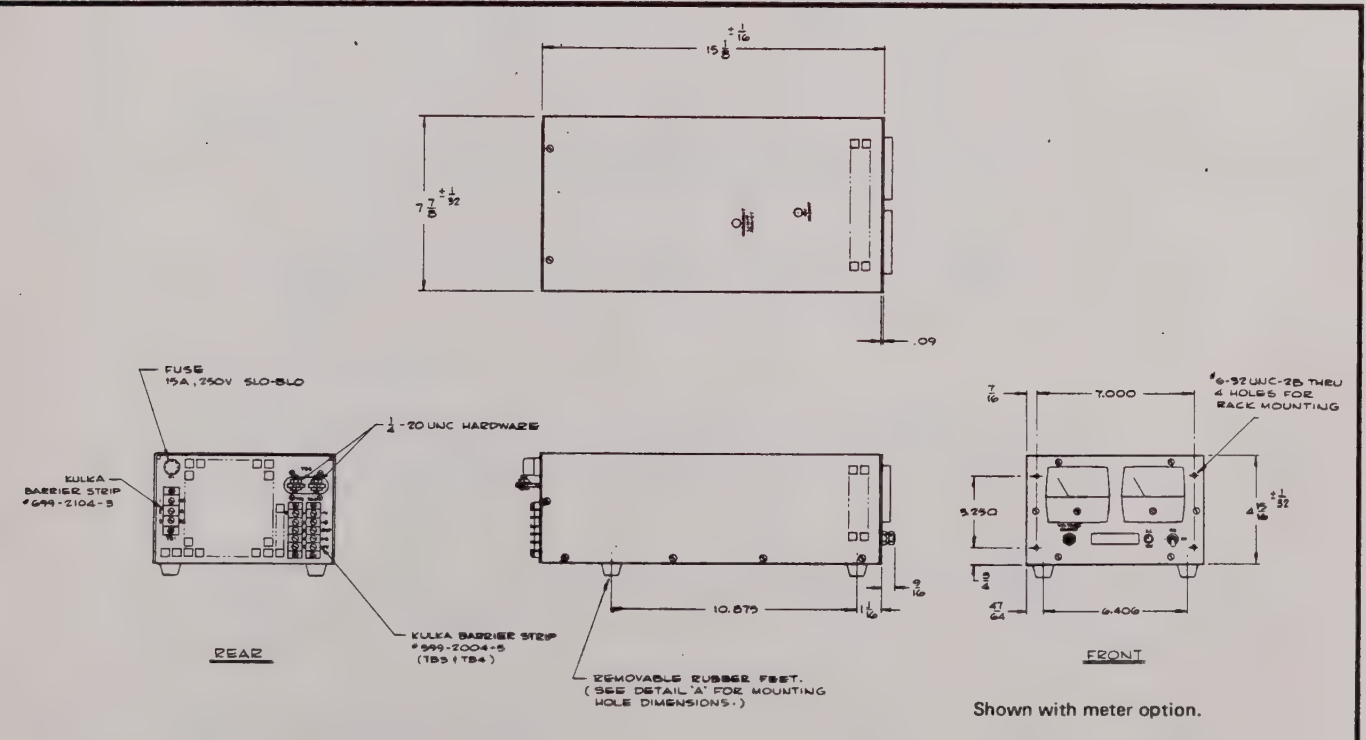
TABLE 1-1 SPECIFICATIONS (Cont'd)

GENERAL & PHYSICAL SPECIFICATIONS (Cont'd)

Overvoltage Protection:	Automatic fast acting, adjustable overvoltage protection available with recessed adjustment.
Dimensions:	5-1/4" x 7-3/4" x 16-1/4".
Weight:	40 lbs.

NOTES: [1]Derate output current 15% for operation above 125 Vac (or 238 Vac).
[2]Derate current 10% or temperature 10 C. Multiply ripply by 2x factor.
[3]When meter option (suffix M) is ordered, unit is provided with four rubber mounting feet for bench use, AC switch and DC output indicator as well as voltage and current meters.

Model	Volts	Max. Amps at Ambient of: 40°C	60°C	71°C	Nominal AC Line Current Rms Amps	Nominal Impedance DC-1 KHz Ohms	Recovery ΔI Amps	Eff* (%)
VPH 5-60 OV**	4.75 to 5.5	60	45	35	8	0.0005	15	40
VPH 12-35	11.0 to 13.0	35	24	20	9	0.001	12	50
VPH 15-31	14.0 to 16.0	31	21	18	9	0.001	10	55
VPH 24-22	23.0 to 26.0	22	15	13	10	0.001	8	57
VPH 28-19	26.0 to 30.0	19	13	11	10	0.001	6	57
VPHD 15-13 (Dual)	±11.5 to 15.5	13	9	7.5	7.5	0.001	4	51



Shown with meter option.

SECTION 2

INSTALLATION AND OPERATION

2.1 MECHANICAL INSTALLATION

When the ValuPower Half Rack series power supply is to be used in a rack configuration, rack adapter RAH-2B may be used for either metered or unmetered models. The RAH-2B will accommodate two VPH units side by side. Rack model RM521 can accommodate VPH units intermixed with other modules as well.

For rack mounting, the four rubber feet are removed before placing unit into the rack adapter. The rubber feet provided on all units allow the power supply to be used as a bench supply.

2.2 ELECTRICAL CONNECTIONS

Input Power

A three-terminal barrier strip mounted on the rear panel provides AC input connections to the unit.

The power handling ability of the AC power lines feeding AC power to the unit must be considered, as serious losses in regulation and substantial increase in ripple may occur as a result of insufficient power capacity of these lines. All AC power line connections must be securely tightened and any movable electric contact surface (such as the wiper arm of a variable transformer) should be kept clear of impedance producing oxide coatings.

Care should be exercised in selecting the proper wire size for the AC input lines. The AC wire size should be sufficient so that the line drop does not exceed a value which will allow the input voltage to drop below the specified lower limit of 105 VAC.

An AWG #16 should be adequate for most short runs of 20 ft. or less. Increase wire size to #14 for up to 50 feet and to #12 for up to 100 feet.

Output, Rear Panel

On single output VPH units, main output is provided on two heavy duty terminals. A second auxilliary terminal block is provided for remote sensing and remote programming.

On dual output VPHD units, the negative output, negative remote sensing and remote programming is provided on one terminal block, with positive output, positive remote sensing, and common voltage return and common remote sensing provided on a second terminal block.

2.3 OPERATING CONFIGURATIONS

The ValuPower series power supplies are designed to operate as highly regulated constant voltage sources with automatic foldback current limiting. There are various operating configurations that can be used by proper application of shorting links

2.3 Continued

and wiring. The following paragraphs describe the various operating configurations and their connections.

Local Voltage Programming (Fig. 2-1)

To adjust the output voltage from the power supply, connect a shorting link across terminals 2 and 3. With this shorting link installed, the voltage adjust control provides adjustment of the output over the rated slot voltage range.

Remote Voltage Programming (Fig. 2-2)

Remote voltage programming is achieved by removing the shorting link from terminals 2 and 3 and substituting a resistive element of proper value across terminals 2 and 3 external to the power supply.

Sensing Connections

Local Sensing (Fig. 2-1)

Local sensing connections are made when rated regulation is not required directly at a remote load.

Connect the load to output studs +V and -V, and ascertain that shorting links are connected between terminals 1 and 2 and 4 and 5.

Remote Sensing (Fig. 2-3)

Remote sensing is used when rated regulation is required at a remote load.

Remove the shorting links between terminals 1 and 2 and 4 and 5. Using a twisted, shielded pair of wires, connect the -S (2) and +S (4) sensing terminals to the load. To prevent damage to the power supply, correct polarity of both the remote sensing and output leads must be observed. The negative remote sensing lead (-S) and negative output lead (-V) must be connected to one side of the load and the positive remote sensing lead (+S) and positive output lead (+V) connected to the other side of the load. The shield should be grounded at the power supply end of the cable.

2.4 CONTROLS

Front Panel

AC ON - switch controls power
Voltage Adjust - Potentiometer, Adjusts voltage output.

Top Cover (Recessed Controls)

Current Limit - Potentiometer adjust current limiting point
OV Adjust (option) potentiometer adjust overvoltage protection point in units having this optional feature.

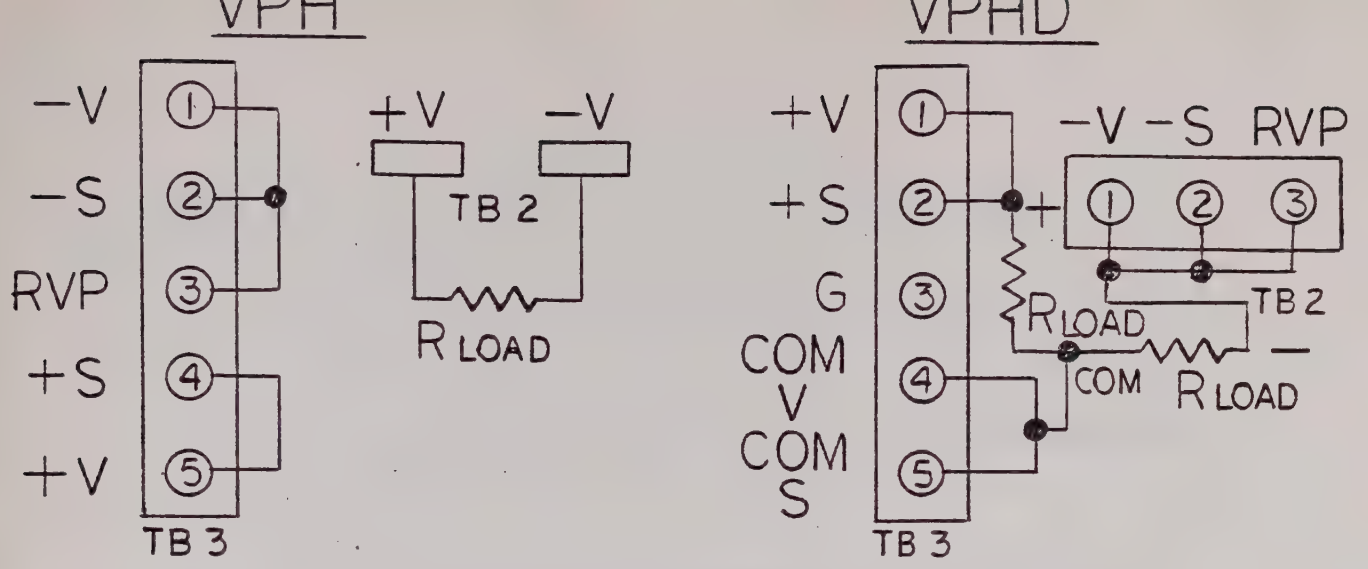


FIG 2−1 LOCAL PROGRAMMING, LOCAL SENSING

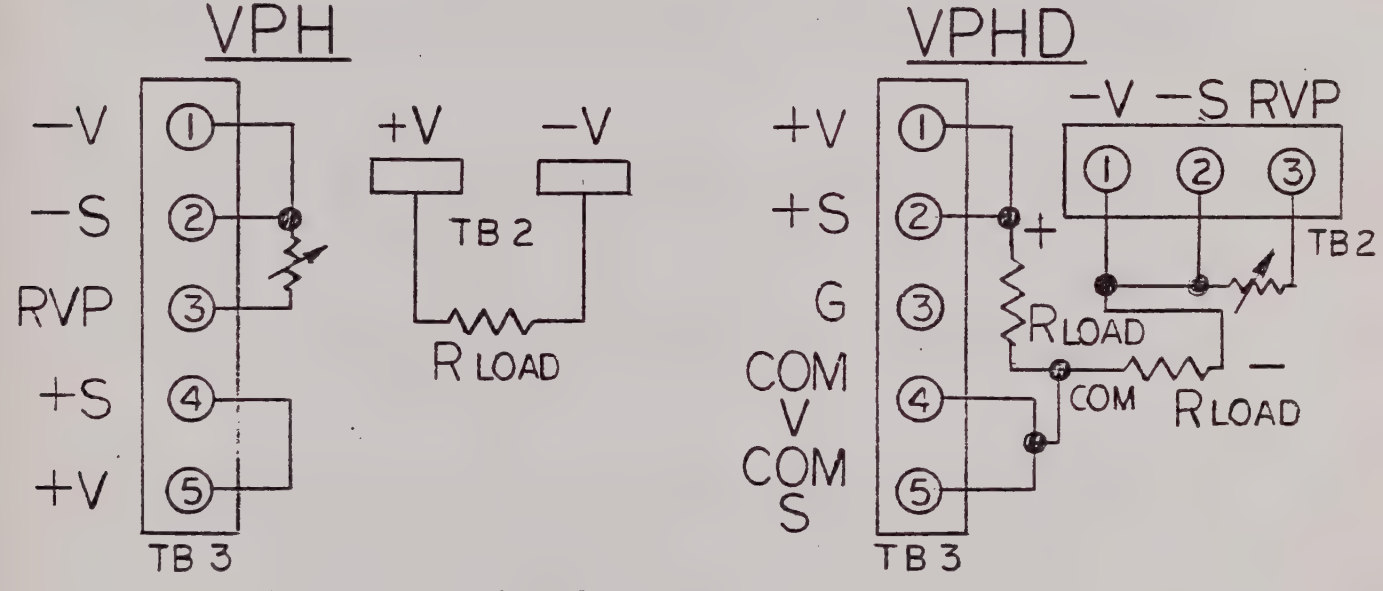


FIG 2−2 REMOTE VOLTAGE PROGRAMMING

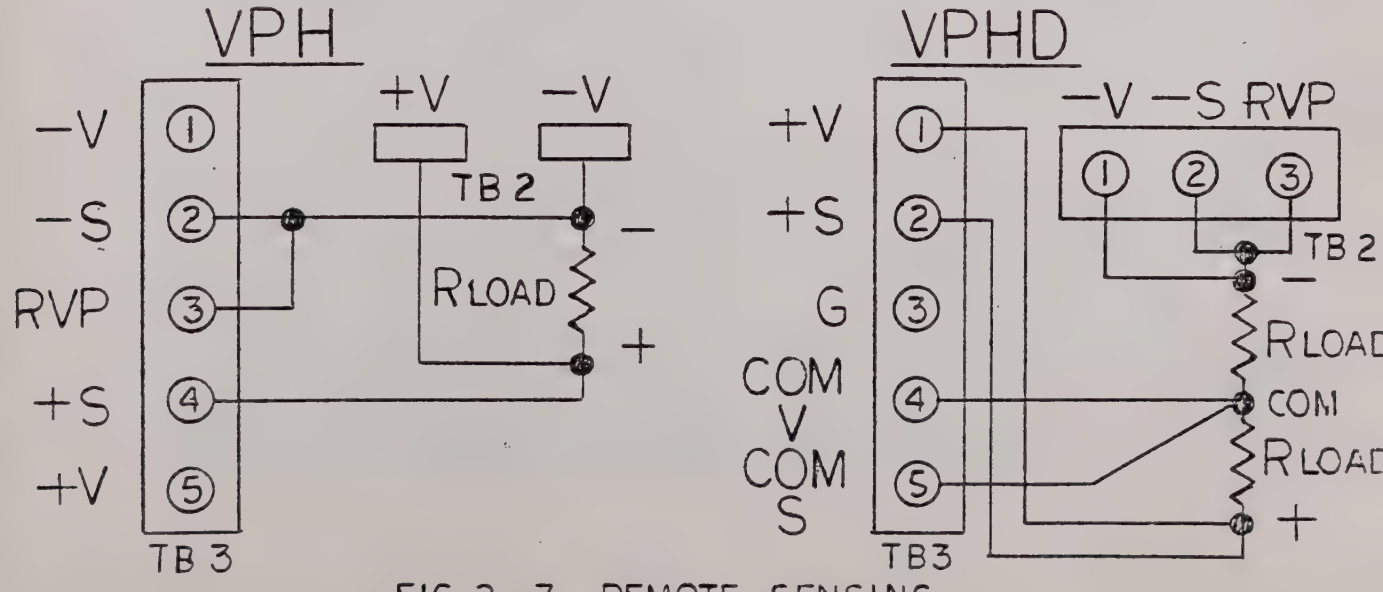


FIG 2−3 REMOTE SENSING

Internal

All internal control settings have been factory preset and require no additional adjusting. However, if it should become necessary to adjust any of the internal controls due to circuit changes caused by component aging or replacement, refer to the calibration section of this manual.

2.5 OPERATION

Control Settings

Set front panel control full CCW, top recessed controls fully CW.

Shorting Links

Prior to the application of power, connect all loads, external wiring and shorting links required for the mode of operation desired.

Grounding

Either side of the output may be grounded, or the output may be used in a floating condition.

Power On

Connect the unit to a nominal AC input power source. Set AC power switch to ON, and observe that pilot lamp is lit.

Warm-Up

No warm-up time is necessary to place the unit into operation. However, a 30 minute warm-up period is recommended to reach rated stability. The unit is now ready for operation.

SECTION 3

THEORY OF OPERATION

3.1 GENERAL

The purpose of the ValuPower series power supplies is to transform and rectify the AC input into a well regulated, stable and adjustable DC output. The following paragraphs describe the major circuits used in the power supply. As each circuit is described, reference should be made to both the Block Diagram, Figure 3-1 and the Schematic Diagram in the rear of this manual.

Primary Input

Input power is obtained through power transformer T101, diodes and filter capacitors. When power switch S101 is set to ON, the output indicator lamp DS 101 glows and AC power is applied to T101 and cooling fan B101. Regulated DC output voltage is immediately available from the power supply.

Series Regulator

The rectified voltage from the diodes and filter capacitors is directed through the Series Pass transistors. The conduction of these transistors is controlled by circuitry which causes them to act as variable resistors. Their overall resistance varies in accordance with the need of the power supply to increase or decrease its output voltage or current. The Series Pass transistors are controlled by driver stages which amplify signals from the Error Amplifier.

Reference Supply, Comparator, Error Amplifier, and Current Limiting

A single integrated circuit, A1, combined the circuitry required to perform the task usually required by many discrete components.

The stable reference voltage is generated and indicated at the circuit reference V REF. When A1 gets the zener regulated voltage across its terminals 5 and P, a precision voltage reference is developed across its terminals 4 and 5. A fixed sample of this voltage is fed into terminal 2 which is one input of the error amplifier.

The voltage which A1 compares the reference voltage to, is fed into terminal 3. Any change in the output voltage is automatically compensated for as the error amplifier generates a correction drive signal at terminal 6 which changes the output voltage accordingly.

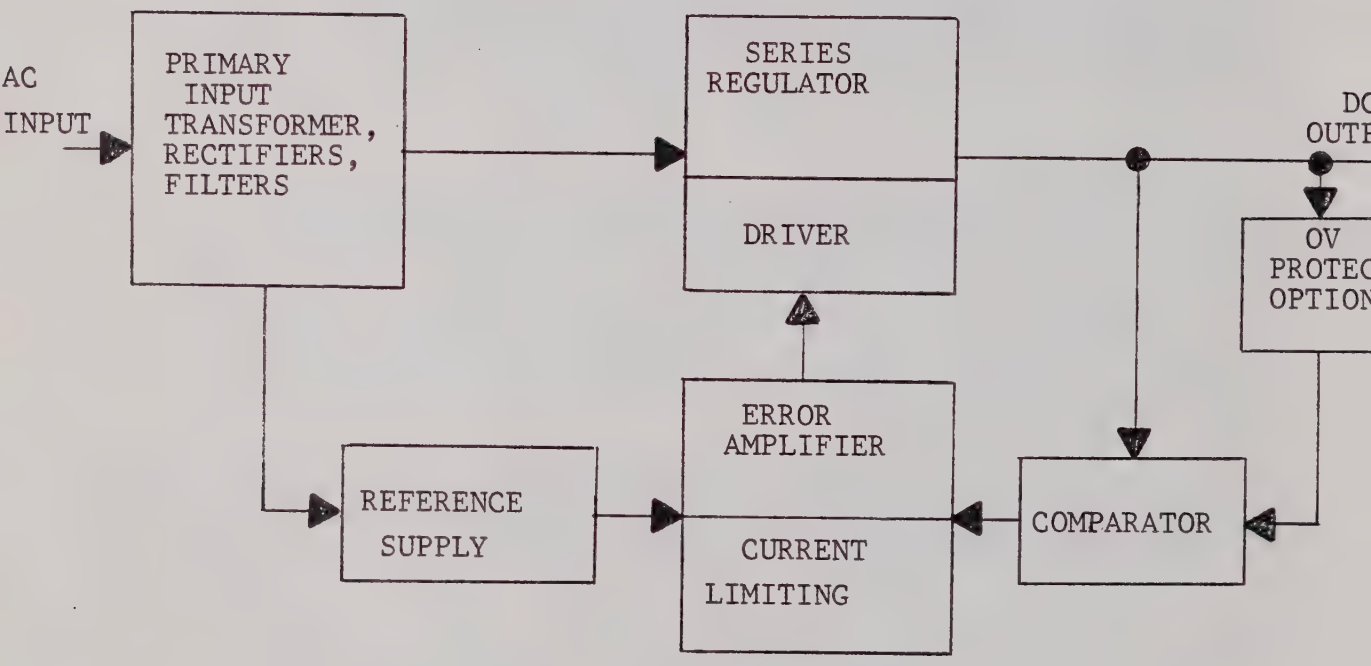
Current limiting is provided by input 10 which will control the error amplifier's output when an overcurrent condition is present.

Terminal A is a compensating input to A1, to insure stability and prevent oscillations under certain load conditions.

3.1 Continued

Overvoltage Circuit (Option)

A sample of the output voltage is developed across R21. This sample is brought to terminal 1 (anode) of the silicon unilateral switch (SUS), which has the characteristics of suddenly conducting when the applied voltage exceeds a minimum threshold. When the SUS conducts it applies a gate signal to the SCR, which crowbars the output to nominal zero.



BLOCK DIAGRAM

FIGURE 3-1

NOTE: The dual output unit uses the negative output as the Master voltage with the positive output circuitry tracking automatically.

SECTION 4

CALIBRATION AND MAINTENANCE

4.1 GENERAL

The following adjustments should be made when necessary to assure optimum operating characteristics and maximum efficiency of the ValuPower series power supplies.

4.2 TEST EQUIPMENT REQUIRED (Or Equivalent)

1. Systron Donner Digital Multimeter Type 9025
2. External Current Shunt (150A rating)
3. Variable Auto transformer, 30 ampere rating

Shorting Link Application

For test purposes shorting links should be connected across rear panel barrier strip terminals 1 and 2, 2 and 3, 4 and 5, and 6 and 7 to provide local sensing and local voltage programming operation. To reduce pickup, shielded wire must be used for all connections between test equipment and the power supply being tested. To prevent ground loops, it is important that only one ground connection be made, as shown in Fig. 4-1. Tighten all terminals as securely as possible and set the front panel control. CW.

4.3 CALIBRATION PROCEDURE

Ammeter Calibration

1. Using a standard ammeter in series with an external load, adjust the load so the unit will operate at its maximum rated current (as indicated on the standard ammeter) and voltage output.
2. Adjust ammeter adjust control (VPH R24, VPHD R45) until ammeter M101 indicates the same current as the standard meter.

Current Limit Test

1. Establish nominal output voltage
2. Set current limit control VPH R11, VPHD R3 fully CW
3. Using an external load, apply a 20% current overload to the unit under test.
4. Adjust current limit control until the overload, as indicated on ammeter MI, is limited to between 5% and 10% (1.05 to 1.10 maximum rated current).

4.3 Continued

Constant Voltage Operation

Load Regulation Test

With the equipment connected as shown in Figure 4-1, connect a suitable load resistance across the output terminal connections. The load resistance selected must be able to dissipate the rated power of the unit (P=IE) and must be of sufficient value to yield the rated output current when the rated voltage is applied. Note the voltage indicated on the Digital Voltmeter. Disconnect the resistive load from the output.

The maximum change in output DC voltage should not exceed by more than .02% or 5mv (whichever is greater) that of the output voltage indicated with the load resistance applied across the output terminals.

Line Regulation Test

Place the resistive load across the output and note the voltage indicated on the DVM. Vary the AC input power 10% above and below the nominal AC input level. The maximum change in output voltage should not exceed by more than ±0.02% or mv (whichever is greater) that of the output voltage measured at either extreme of the AC input.

Ripple Voltage Test

In order to reduce pickup, shielded test leads should be used in making ripple measurements. With the resistive load connected across the output terminals, measure the AC ripple with the AC scale of the DVM. Vary the AC input power 10% above and below the nominal AC input level. The maximum ripple amplitude should not exceed 1mv RMS.

Overvoltage Sensitivity (option) (See Page 4-5 for Dual Unit)

The trigger point of the OV protection circuit is determined by the setting of the OV control R21, located through the top cover. To set the OV circuit to trigger within the output range of the power supply, set R21 CW. Turn on the supply and adjust it for the desired OV firing point. Turn R21 CCW until the output voltage drops as indicated by the voltmeter.

To set the OV circuit to fire at higher output voltage than the output voltage of the supply, a second current limiting type power supply is needed. With the supply under test, set its output voltage to any value. Turn R21 CW and connect the second supply across its output terminals. Set the second supply's output voltage to the desired OV firing point. Turn R21 CCW until the output of the supply drops to a low value as indicated on the voltmeter. This indicates that the OV circuit has fired at the voltage set on the second power supply.

4.4 MAINTENANCE

GENERAL

This power supply is a precision electronic instrument. It is strongly recommended that only experienced troubleshooting personnel perform troubleshooting operations or attempt to repair the unit. If the power supply appears to be malfunctioning at all, the following procedure is recommended for isolating possible defects.

Loads and Interconnections

1. Disconnect all loads and interconnections.

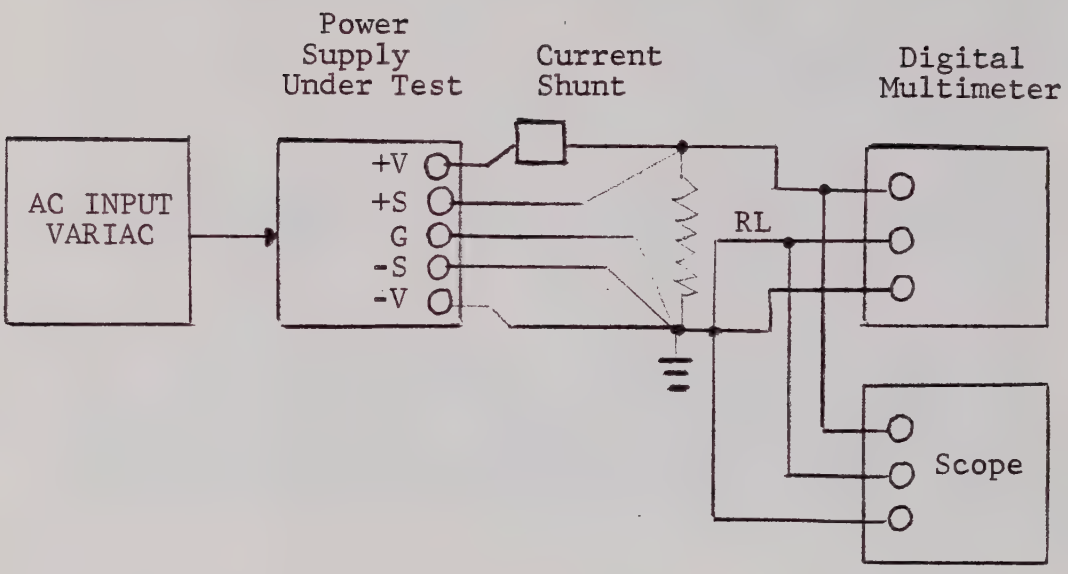
2. Connect a resistive load across the output terminals and operate the unit to determine whether the fault lies within the unit or externally. Observe that shorting links are in place across terminals to provide local sensing operation.

3. Set input voltage to nominal value (115 VAC) and operating controls for rated output. Satisfactory operation at this time would indicate that any malfunction previously encountered, is external in nature. All interconnections and loads normally used in conjunction with this power supply should then be carefully checked for electrical defects.

Troubleshooting

1. Set Voltage Adjust control fully CW. Use a high impedance digital voltmeter to check the voltages across the various circuit components, if shown on the Schematic Diagram located at the rear of this instruction manual. Any sample voltages listed apply only if the unit is operating at its nominal AC input, and has a dummy load of sufficient size connected across its output to allow operation at maximum rated current and voltage output levels. Any reading which is grossly incorrect, indicates that the stage being tested or the one immediately preceding it is defective. The Block Diagram, Schematic Diagram and appropriate sections of the Theory of Operation will prove helpful in any troubleshooting work. Proper polarity to be observed when testing can be easily obtained from the Schematic Diagram.

2. If voltage checks show no noticeable deviations from the prescribed values, disconnect AC power and proceed with point-to-point resistance checks across pots, switches, diodes, resistors, transistors, in that order.



CONSTANT VOLTAGE
OPERATION

TEST EQUIPMENT SET-UP

FIGURE 4-1

ADDENDUM FOR DUAL OUTPUT VPHD

VPHD OVERVOLTAGE PROTECTION

The overvoltage protection provided on the dual output VPHD is one whereby the total voltage of the plus and minus outputs is sensed. The overvoltage trip point is therefore approximately twice that of each individual supply. If either supply should go high in voltage it will cause the overvoltage crowbar to clamp both the plus and minus outputs to nominal zero volts.

The trigger point of the OV protection circuit is determined by the setting of the OV control R21, located through the top cover.

To set the OV circuit to trigger within the output voltage sum of the plus and minus voltages, set R21 CW. Turn on the supply and adjust the negative output voltage (the negative output is the master voltage with the positive output circuitry tracking automatically) for the desired OV firing point. Turn R21 CCW until the output voltage drops as indicated by the voltmeter.

To set the OV circuit to fire at a higher output voltage than the output voltages of the supply will adjust to, a second current limiting type power supply is needed.

Set the supply under test to its desired voltage with R21 turned CW. Connect the second supply across the plus and minus terminals of the supply under test and set its output voltage to the desired OV trip point. Turn R21 slowly CCW until the OV triggers as indicated by the drop in output voltage. This indicates that the OV circuit has fired at the voltage set on the second power supply.

ITEM NO.	MFR'S	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
1		T062500	SHIPPING ASS'Y		X	X		
3			SCHEMATIC	D-124820	R	R		
5B		PD25037	ASS'Y TOP COVER & LABEL		1	2		
6C		065613	COVER, FINISHED		1	2		
7			NAMEPLATE	T101040	1	R		
8		840405	PLUG BUTTON		2	R		
9		065148	AC COVER		1	2		
12B		PD25020	CHASSIS ASS'Y #1		1	2		
13C		065608	CHASSIS		1	2		
14		840192	RUBBER FEET		4	1		
15		820286	CAP. 6,300µf-75V	C105, 106	3	1		
16			S/A C105	C108		R		
17		820274	6000µf-40V	C107	1	1		
20		106664	FAN	B101	1	1		
21		106879	CAP. CLAMP		1	1		
22		100725	" "		1	1		
23		065612	" "		1	2		
24		T910110	GROMMET		1	R		
25C		C65609	BRKT, MTG-XFMR & CHOKE		1	2		
26		640530	RES. 2K-5W	R118	1	1		
27								
28		T971020	1/4-20 x 1 1/4 HEX BOLT		2	1		
29C		119112	FAN PLATE RIGHT		1	2		
30C		119122	" " LEFT		1	2		
31		T910010	GROMMET, 3/16		1	R		
32		065614	BAFFLE		1	2		
33		T950174	INSULATION RUBBER		1	R		

REV | DESCRIPTION

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDENT 52542
PLANNER	PREP DATE	SYSTRON DONNER CORPORATION		
	CHK'D	SHIPPING ASS'Y VPH 28-19 MOV		
MAT. DUE	APP'D			
B/U REQ.		DRAWING NO.		
		REF	SIZE	PART NO. REV
B/U COMP		—	P	T062500 D
	USED ON	SHEET 1 OF 7		

ITEM NO.	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
38B	PD25034	CHASSIS ASS'Y #2		1	2		
39	800304	CAP. 1μf-250V	C103	2	1		
40		S/A C103	C104		R		
41	504126	TRANSFORMER	T101	1	2		
42	710454	DIODE IN5401	CR101, 102	2	1		
43	504127	CHOKE	L101	1	2		
44							
45B	118222	BUSS BAR POS. OUTPUT		1	2		
46C	118232	" " NEG. OUTPUT		1	2		
47D	122852	STRIP, OUTPUT HOLDING		1	2		
48B	118392	SHUNT	R117	1	2		
49	800185	CAP. .1μf-250V	C101, 102	2	1		
50	800252	.22μf-250V	C109, 110	2	1		
51	100827	6-32 x 5/16 HEX SPACER		2	1		
52	T9904500	P.C. SUPPORT		2	1		
56A	PD25019	REAR PANEL ASS'Y.		1	2		
57	065611	" "		1	2		
58	117377	FUSEHOLDER		1	1		
59	870212	FUSE 15A-250V	F1	1	1		
60	850150	BARRIER STRIP	TB1	1	1		
61B	118242	INSULATOR BLOCK	TB2	1	2		
62	850052	BARRIER STRIP	TB3	1	1		
63	840217	" " LINKS		3	1		
64	100827	HEX SPACERS 5/16 Lg		2	1		
65	116901	PLUG BUTTON		1	R		

REVISIONS
REV | DESCRIPTION

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDEN
				52542

PLANNER | PREP DATE | SYSTRON DONNER CORPORATION
CHK'D
MAT. DUE | APP'D
R/U REQ.
R/U COMP
USED ON

SHIPPING ASS'Y
VPH 28-19MOV

DRAWING NO.
REF | SIZE | PART NO. | REV
— | P | T062500

SHEET 2 OF 7

NO.	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SH QT
70A	PD25033	FRONT PANEL ASS'Y		1	2		
71C	119284	" " FINISH		1	2		
72A	06516501	METER ASS'Y 0-30A	M101	1	2		
73	065160	METER MVMT 1mA 77Ω		1	1		
74	117397	DIAL, BLANK	B-065165	1	1		
75B	06517102	METER ASS'Y 0-40V	M102	1	2		
76B	065160	METER MVMT 1mA 77Ω		1	1		
77	117397	DIAL, BLANK	B-065171	1	1		
78	065049	P.C. BOARD		1	2		
79	102473	POT. 5 K	R401	1	1		
80	102145	RES. 37.4K	R402	1	1		
81	103862	HEX NUT		1	1		
82	116669	SWITCH	S101	1	1		
83	770090	LED	DS101	1	1		
84	600230	POT. V ADJ. 2.5K-2W	R116	1	1		
85	840220	SHAFT-LOCK		1	1		
89A	PD25176	HEAT-SINK ASS'Y #2		1	2		
90C	118982	HEAT-SINK		1	2		
91	700085	TRANSISTOR, 2N3442	Q101	1	1		
92	102738	2N3738	Q103	1	1		
93	830101	TRANSISTOR SOCKET		1	1		
94	830103	" "		1	1		
95	640069	RES. .47Ω-2W	R101	1	1		
96	101467	1K-½W	R103	1	1		
97	101498	100Ω-½W	R114	1	1		
98	859019	TERMINAL STRIP		1	1		
99	103358	MICA WASHER		1	R		

DESCRIPTION

KEY

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDENT 52542
PLANNER	PREP DATE		SYSTRON DONNER CORPORATION	
MAT. DUE	CHK'D / APP'D		SHIPPING ASS'Y VPH 28-19 MOV	
B/U REQ.			DRAWING NO.	
B/U COMP	USED ON		SIZE PART NO. — P T062500	REV
			SHEET 3 OF 7	

FORM 28-A 11 JUL 75

ITEM NO.	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
		HEAT-SINK ASS'Y #2 (CONT)					
101	T990285	MICA WASHER		1	R		
053	PD25031	HEAT-SINK O.V. ASS'Y		1	2		
060	T115802	HEAT-SINK FAB		1	2		
073	065444	BRKT PC SUPPORT		2	2		
08	640190	RES. 10Ω-2W	R115	1	1		
09	630018	0.1Ω-5W-3%	R104, 107,	6	1		
10		S/A R104	108, 110,		R		
11		S/A R104	111, 112		R		
12	118602	BUSS BAR EMITTER		1	1		
13	100413	DIODE, IN5395	CR109	1	1		
14	860270	6-32×¼ HEX SPACER		2	1		
15	T990415	NYLON PUSH-IN NUT		3	R		
16	T990405	" " " "		2	R		
17	T990450	BRKT, P.C. SUPPORT		2	1		
18	118992	HEAT-SINK (ADDITION)		1	2		
19	T960347	RIVET		4	R		
20	700088	TRANSISTOR, 2N6258	Q104, 107,	6	1		
21		S/A Q104	108, 110,		R		
22		S/A Q104	111, 112		R		
23	720132	DIODE, IN1200A	CR107, 108	2	1		
24	720488	IN2138/60HFG	CR103, 104	2	1		
25	830101	TRANSISTOR SOCKET		6	1		
26	T990350	RING INSULATOR		1	R		
27	T990307	MICA WASHER		2	R		
28	T960085	SOLDER LUG		1	R		
29	880003	THERMAL SWITCH	S102	1	1		
30	720008	DIODE, SCR, 35A-50V	CR106	1	1		
31	T990340	RING INSULATOR		3	R		
32	T990295	MICA WASHER		2	R		

REVISIONS DESCRIPTION

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDEN
				52542

PLANNER | PREP DATE | CHK'D | APP'D | MAT. DUE | B/U REQ. | B/U COMP | USED ON

SYSTRON DONNER CORPORATION

SHIPPING ASS'Y
VPH 28-19 MOV

DRAWING NO.

REF	SIZE	PART NO.	RE
—	P	T062500	

SHEET 4 OF 7

ITEM NO.	REV	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT CODE	ISS. QTY	SHT QTY
			HEAT-SINK O.V. ASS'Y (CONT)		X	X		
4		T960640	LUG		1	R		
8	C	PD25030	CONTROL BOARD ASS'Y		1	2		
9	D	T112256	" " FAB		1	2		
0		102598	CAP. 100μf-50V	C1	1	1		
1		800090	.01μf-600V	C3,8	2	1		
2		800002	470pf-600V	C4	1	1		
3		810060	35μf-25V	C5,6	2	1		
4		100134	.05μf-200V	C7	1	1		
5		100178	.1μf-100V	C9	1	1		
6		810006	2μf-50V	C10	1	1		
7		821006	68μf-15V	C11	1	1		
8		100063	10μf-25V	C12	1	1		
9		810072	50μf-50V	C13	1	1		
53		100413	DIODE, IN5395	CR1,2,6,7,	6	1		
54			S/A CR1	12,13		R		
55		720410	IN4741A	CR3	1	1		
56		100387	IN753A	CR4	1	1		
57		100395	IN758A	CR5	1	1		
58								
59		741001	SCR, 2N4990	CR9	1	1		
60		100378	DIODE, IN751A	CR10	1	1		
61		720440	IN4148	CR11	1	1		
65		025756	IC	A1	1	1		

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDENT
				52542

PLANNER	PREP DATE	SYSTRON DONNER CORPORATION
	CHK'D	SHIPPING ASS'Y VPH 28-19 MOV
MAT. DUE	APP'D	
B/U REQ.		DRAWING NO.
B/U COMP		REF — SIZE P PART NO. T062500 REV
	USED ON	SHEET 5 OF 7

DESCRIPTION

REV

ITEM NO.	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
		CONTROL BD ASS'Y (CONT)		X	X		
67	106587	TRANSISTOR, 2N2219A	Q1	1	1		
69	640440	RES. 470Ω-2W-10%	R1	1	1		
70	600207	POT. 2K-½W-20%	R3	1	1		
71	620436	2.26K-½W-1%	R4	1	1		
72	620634	13.7K	R5	1	1		
73	620534	4.64K	R6	1	1		
74	620402	1.96K	R7	1	1		
75	106012	2.2Ω	R8, 14	2	1		
76	117188	POT. 100Ω-½W	R11, 16, 21, 24		1		
77		S/A R11	24		R		
78	101511	4.7K-½W-10%	R12	1	1		
79	101471	10K-½W-10%	R13	1	1		
80	630450	2.5K-3W-3%	R15	1	1		
81	640400	250Ω-10W	R17	2	1		
82		S/A R17	R18		R		
83	640389	200Ω-5W	R19	1	1		
84	640280	47Ω-2W-10%	R20	1	1		
85	101459	1.5K-½W-5%	R22	1	1		
86	101467	1K-½W-5%	R23, 29	2	1		
87	640528	1.8K-2W-10%	R25	1	1		
88	611100	2.2M-½W-5%	R26	1	1		
89	101511	4.7K-½W-5%	R27, 31	2	1		
90	101510	6.8K-½W-5%	R28	1	1		
91	101667	220Ω-½W-5%	R30	1	1		
92	101454	2.2K-½W-5%	R32	1	1		

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDENT
				52542

PLANNER | PREP DATE | CHK'D | APP'D | MAT. DUE | B/U REQ. | B/U COMP | USED ON

SYSTRON DONNER CORPORATION

SHIPPING ASS'Y
VPH 28-19 OV

DRAWING NO.
REF | SIZE | PART NO.
— | P | T062500

SHEET 5 OF 7

REVISION DESCRIPTION

ITEM NO.	SYM	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
99		PD2510501	AC-DC HARNESS		1	2		
00		PD25105	HARNESS LIST			R		
01		VPH-1	" LAYOUT			R		
03		PD2709001	DC CABLE		1	2		
04		PD27090	" " LIST			R		
05		VPH-2	" " LAYOUT			R		
07		PD25028	LOOSE WIRES		1	2		
11	A		WIRING, T101 & L101	PD25024	1	R		
12	A		" REAR PANEL	PD25021	1	R		
13	A		" FRONT PANEL	PD25036	1	R		
14	A		" P.C. BOARD	PD25026	1	R		
15	A		" HEAT-SINK	PD25177	1	R		
16	B		" " "	PD25032	1	R		
17	B		" CHASSIS	PD25035	1	R		

DESCRIPTION

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDENT
				52542.

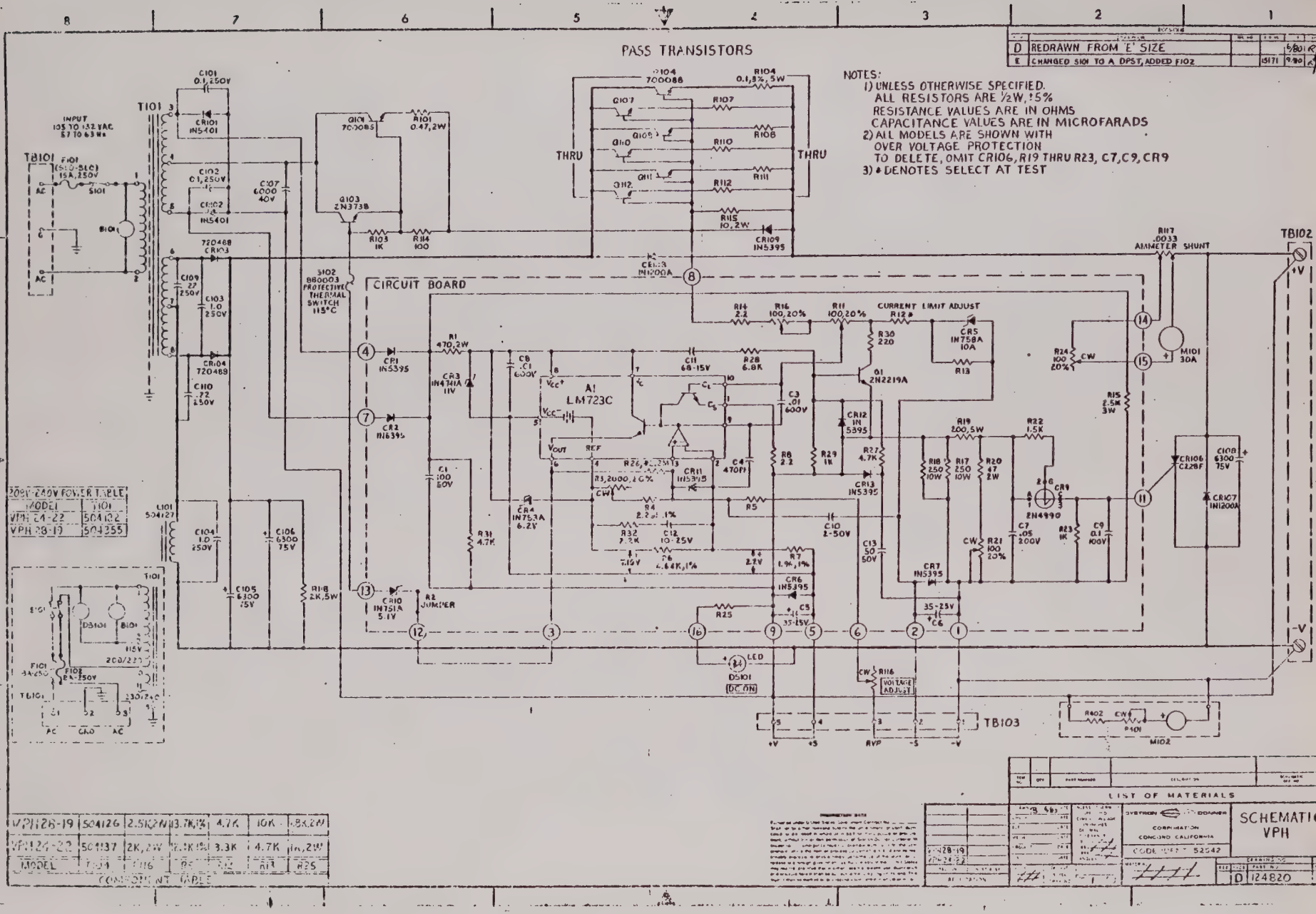
PLANNER | PREP DATE | CHK'D | APP'D | MAT. DUE | B/U REQ. | B/U COMP

SYSTRON DONNER CORPORATION

SHIPPING ASSY
VPH 28-19 MOV

DRAWING NO.

REF	SIZE	PART NO.	REV
—	P	T062500	


PASS TRANSISTORS
CIRCUIT BOARD
NOTES:
1) UNLESS OTHERWISE SPECIFIED.
ALL RESISTORS ARE ½W, ±5%
RESISTANCE VALUES ARE IN OHMS
CAPACITANCE VALUES ARE IN MICROFARADS
2) ALL MODELS ARE SHOWN WITH
OVER VOLTAGE PROTECTION
TO DELETE, OMIT CR106, R19 THRU R23, C7, C9, CR9
3) * DENOTES SELECT AT TEST
D REDRAWN FROM 'E' SIZE
E CHANGED S101 TO A DPST, ADDED F102
INPUT 105 TO 132 VAC 57 TO 63 Hz
208V-240V POWER TABLE
MODEL T101
VPH 24-22 504102
VPH 28-19 504355
CONFIGURATION TABLE
VPH28-19 504126 2.5K,2W 13.7K,1% 4.7K 10K 1.8K,2W
VPH24-22 504137 2K,2W 12.1K,1% 3.3K 4.7K 1K,2W
MODEL T101 R116 R23 R24 R25
LIST OF MATERIALS
SCHEMATIC VPH
SORENSON DIVISION OF RAYTHEON COMPANY CONCORD CALIFORNIA
CODE IDENT 52542
DRAWING NO 124820
SIZE D

ITEM NO.	SIZE	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
1		T062400	SHIPPING ASSY		X	X		
3D			SCHEMATIC	124820	R	R		
6B		FD25205	ASSY TOP COVER & LABEL		1	2		
7C		065613	COVER, FINISHED		1	2		
8			NAMEPLATE	T101040	1	R		
9		840405	PLUG BUTTON		1	R		
10A		065148	AC COVER		1	2		
11		860181	ROUND SPACERS		2	1		
13B		FD25185	CHASSIS ASSY #1		1	2		
14C		065608	CHASSIS		1	2		
15		840192	RUBBER FEET		4	1		
16		820286	CAPACITOR 6300µf-75V	C105 106	3	1		
17			S/A C105 C108					
18		820274	6000µf-40V	C107	1	1		
20		106664	FAN	B101	1	1		
21		106879	CAP. CLAMP		1	1		
22		100725	" "		1	1		
23		065612	" "		1	2		
24		T910110	GROMMET		1	R		
25C		065609	BRKT. MTG., XFMR & CHOKE		1	2		
26		640530	RESISTOR 2K Ω 5 W	R118	1	1		
27								
28		T971020	1/4-20 x 1 1/4 HEX BOLT		2	1		
29C		119112	FAN PLATE RIGHT		1	2		
30C		119122	" " LEFT		1	2		
31		T910010	GROMMET, 3/16		1	R		
32		065414	BAFFLE		1	2		

REVISIONS REV	DESCRIPTION
A	CHANGE PER ECO 15147 1-23-80
B	CHANGE PER ECO 15158 5-20-80

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDENT
				52542

PLANNER | PREP DATE | CHK'D | APP'D | MAT. DUE | B/U REQ. | B/U COMP | USED ON

SYSTRON DONNER CORPORATION

SHIPPING ASSY
VPH24-22 MOV

DRAWING NO.

REF	SIZE	PART NO.	REV
—	P	T062400	B

SHEET 1 OF 7

FORM EB-A 11 JUL 75

ITEM NO.	SIZE	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
34	A	PD25195	HEATSINK ASS'y #2		1	2		
35	C	118982	HEATSINK		1	2		
36		700085	TRANSISTOR	Q101	1	1		
37		102738	" 2N3738	Q103	1	1		
38		830101	" SOCKET		1	R		
39		830103	" "		1	R		
40		640069	RESISTOR .47Ω 2W	R101	1	1		
41		101467	" 1KΩ 1/2W	R103	1	1		
42		101498	" 100Ω 1/2W	R114	1	1		
43		859019	TERMINAL STRIP		1	1		
44			MICA WASHER	T990290	1	R		
45			" "	T990285	1	R		
50	A	PD25184	PANEL REAR ASS'y		1	2		
51		117377	FUSEHOLDER		1	1		
52		870212	FUSE 15A-250V	F1	1	1		
53		850150	BARRIER STRIP	TB1	1	1		
54	B	118242	INSULATOR BLOCK	TB2	1	2		
55		850052	BARRIER STRIP	TB3	1	1		
56		840217	" " LINKS		3	1		
57		065611	REAR PANEL		1	2		
60	B	PD25201	CHASSIS ASS'y #2		1	2		
61		800304	CAP. 1μf - 250V	C103, 104	2	1		
62		504137	TRANSFORMER	T101	1	2		
63		710454	DIODE IN5401	CR101, 102	2	1		
64		504127	CHOKE	L101	1	2		
65	B	118222	BUS BAR POS. OUTPUT		1	2		
66	C	118232	" " NEG. OUTPUT		1	2		

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDEN 52542
PLANNER	PREP DATE		SYSTRON DONNER CORPORATION	
	CHK'D		SHIPPING ASS'y VPH24-22 MOV	
MAT. DUE	APP'D			
B/U REQ.			DRAWING NO.	
			REF — SIZE P PART NO. T062400	RE
B/U COMP			USED ON	SHEET 2 OF 7

REVISIONS DESCRIPTION REV

FORM EE A 11 JUL 75

ITEM NO.	SIZE	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
67			CHASSIS ASS'Y #2 (CONT.)					
68	B	122852	STRIP, OUTPUT HOLDING		1	2		
69	B	118392	SHUNT		1	2		
70		800185	CAPACITOR .1μf 250V	C101, 102	2	1		
71		800252	" .22μf 250V	C109, 110	2	1		
72		T990450	P.C. SUPPORT		2	1		
73								
75	A	PD25200	FRONT PANEL ASS'Y		1	2		
76	C	118284	" " FINISH		1	2		
77	A	06516501	METER ASS'Y 0-30A	M101	1	2		
78		065160	METER MVMT 1ma 77Ω		1	1		
79		117397	DIAL, BLANK	B065165	1	1		
80	B	06517102	METER ASS'Y 0-40V	M102	1	2		
81	B	065160	METER MVMT 1ma 77Ω		1	1		
82		117397	DIAL, BLANK	B065171	1	1		
83		065049	P.C. BOARD		1	1		
84		117124	POT 5K	RA01	1	1		
85		102145	RES 37.4K	RA02	1	1		
86		103862	HEX NUT		1	1		
87		880611	SWITCH	S101	1	1		
88		770090	L.E.D	DS101	1	1		
89		600220	RESISTOR V ADJ 2K 2W	R116	1	1		
90		840220	SHAFTLOCK		1	1		
94	AB	PD25199	HEATSINK OV ASS'Y		1	2		
95	D	T115802	HEATSINK FAB		1	2		
96	B	065444	BKT- PC SUPPORT		2	2		
97		640190	RESISTOR 10Ω 2W	R115	1	1		
98		630018	" 0.1Ω 5W 3%	R104, 107	6	1		
99			" S/A R104	R108, 110				

REVISIONS
REV | DESCRIPTION

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDENT
				52542

PLANNER | PREP DATE | CHK'D | APP'D | MAT. DUE | B/U REQ. | B/U COMP | USED ON

SYSTRON DONNER CORPORATION

SHIPPING ASS'Y
VPH 24-22 MOV

DRAWING NO.

REF	SIZE	PART NO.	REV
—	P	TC2400	

SHEET 3 OF 7

ITEM NO.	SIZE	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SH QT
100			HEATSINK OV ASS'Y (CONT)					
102			RESISTOR S/A R104	R111, 112				
103	C	118602	BUS BAR EMITTER		1	2		
104		100413	DIODE IN5395	CR109	1	1		
105		T990450	P.C. SUPPORT		2	1		
106		T990415	NYLON PUSH-IN NUT		3	R		
107		T990405	" " " "		2	R		
108	C	118992	HEAT-SINK (ADDITION)		1	2		
109			RIVET	T960347	4	R		
110		700088	TRANSISTOR 2N6258	Q104, 107	6	1		
111			" S/A Q104	Q108, 110				
112			" S/A Q104	Q111, 112				
113		720132	DIODE IN1200A	CR108, 107	2	1		
114		720488	" IN2138-60HFG	CR103, 104	2	1		
115		830101	TRANSISTOR SOCKETS		6	1		
116			RING INSULATOR	T990350	1	R		
117			MICA WASHER	T990307	2	R		
118			SOLDER LUG	T960085	1	R		
119		880003	THERMAL SWITCH	S102	1	1		
120		720008	DIODE-SCR 35A-50V	CR106	1	1		
121			RING INSULATOR	T990340	3	R		
122			MICA WASHER	T990295	2	R		
123			LUG	T960640	1	R		
125		PD25194	JUMPER LIST		1	2		
127		T9A2307	HARNESS AC/DC		1	2		
128		PD25180	" LIST					
129		VPH-1	" LAYOUT					
130		T9A2416	DC CABLE		1	2		
131		PD27093	" " LIST					
132		VPH-2	" LAYOUT					

REVISIONS
REV | DESCRIPTION

MODEL	JOB NO	LOT QTY	LOT NO.	CODE IDEN
				52542

PLANNER | PREP DATE | SYSTRON DONNER CORPORATION

CHK'D | APP'D | SHIPPING ASS'Y VPH24-22MOV

MAT. DUE

B/U REQ.

B/U COMP

DRAWING NO.

REF	SIZE	PART NO.	REV
—	P	T062400	

USED ON | SHEET 4 OF 7

FORM E8-A 11 JUL 75

ITEM NO.	SIZE	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
139	C	PD25198	CONTROL BOARD ASS'Y		1	2		
140	D	T112256	" " FAB		1	2		
142		102598	CAPACITOR 100μf 50VDC	C1	1	1		
143		800090	.01μf 600V	C3	2	1		
144		800002	470pf 600V	C4	1	1		
145		810060	35μf 25V	C5	2	1		
146			S/A C5	C6				
147		100134	.05μf 200V	C7	1	1		
148			S/A C3					
149		100178	.1μf 100V	C9	1	1		
150		810006	2μf 50V	C10	1	1		
151		821006	68μf 15V	C11	1	1		
152		100063	10μf 25V	C12	1	1		
153		810072	50μf 50V	C13	1	1		
155		100413	DIODE IN5395	CR1	6	1		
156			S/A CR1	CR2				
157		720410	IN4741A	CR3	1	1		
158		100387	IN753A	CR4	1	1		
159		100395	IN758A	CR5	1	1		
160			S/A CR1	CR6				
161			" "	CR7				
162			NOT USED	CR8				
163		7A1001	TRIAC 2N4990	CR9	1	1		
164		100378	DIODE IN751A	CR10	1	1		
165		720440	" IN4148	CR11	1	1		

REVISIONS

REV	DESCRIPTION

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDENT
				52542

PLANNER | PREP DATE | CHK'D | APP'D | MAT. DUE | B/U REQ. | B/U COMP | USED ON

SYSTRON DONNER CORPORATION

SHIPPING ASS'Y
VPH 24-22 MOV

DRAWING NO.

REF	SIZE	PART NO.	REV
—	P	T062400	

SHEET 5 OF 7

FORM ES-A 11 JUL 75

ITEM NO.	SIZE	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SH QT
166		PD25198	CONTROL BD. ASS'Y (CONT.)					
168			DIODE S/A CR1	CR12				
169			" " "	CR13				
172		025756	IC	A1	1	1		
174		106587	TRANSISTOR 2N2219A	Q1	1	1		
176		6A0440	RESISTOR 470Ω 2W 10%	R1	1	1		
177		600207	POT 2K 1/2W 20%	R3	1	1		
178		620436	2.26K 1/2W 1%	R4	1	1		
179		102201	12.4K	R5	1	1		
180		620534	4.64K	R6	1	1		
181		620402	1.96K	R7	1	1		
182		106012	2.2Ω	R8	2	1		
183		117188	POT 100Ω 1/2W	R11	4	1		
184		101432	3.3K 1/2W 5%	R12	1	1		
185		101511	4.7K 1/2W 5%	R13	1	1		
186			S/A R8	R14				
187		630450	2.5K, 3W 3%	R15	1	1		
188			S/A R11	R16				
189		6A0400	250Ω, 10W	R17	2	1		
190			S/A R17	R18				
191		6A0389	200Ω 5W	R19	1	1		
192		6A0280	47Ω 2W 10%	R20	1	1		
193			S/A R11	R21				
194		101459	1.5K 1/2W 5%	R22	1	1		
195		101467	1K 1/2W 5%	R23	2	1		
196			S/A R11	R24				
197		6A0500	1K 2W 10%	R25	1	1		
198		611100	2.2MEG 1/2W 10%	R26	1	1		

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDEN
				52542

PLANNER	PREP DATE	SYSTRON DONNER CORPORATION
	CHK'D	SHIPPING ASS'Y
MAT. DUE	APP'D	VPH 24-22 MOV
B/U REQ.		DRAWING NO.
B/U COMP	USED ON	REF — SIZE P PART NO. T062400
		SHEET 6 OF 7

REVISIONS
DESCRIPTION
REV

FORM EB A 11 JUL 75

ITEM NO.	SI-FE	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
199		PD25198	CONTROL BD. ASSY (CONT.)					
201		101511	RESISTOR 4.7K ½W 5%	R27	2	1		
202		101510	6.8K ½W 5%	R28	1	1		
203			S/A R23	R29				
204		101667	220Ω 1/2W 5%	R30	1	1		
205			S/A R27	R31				
206		101454	2.2K 1/2W 5%	R32	1	1		
208		8A0411	TRANSISTOR PAIR		1	R		
209		8A0420	" "		1	R		
215A			WIRING T101 & L101	PD25190	1	R		
216A			REAR CHASSIS	PD25187	1	R		
217A			FRONT PANEL	PD25204	1	R		
218A			PC. BOARD	PD25192	1	R		
219A			HEAT SINK	PD25196	1	R		
220B			" "	PD25202	1	R		
221B			CHASSIS	PD25203	1	R		

REVISIONS
REV | DESCRIPTION

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDENT
				52542

PLANNER | PREP DATE | SYSTRON DONNER CORPORATION
CHK'D | SHIPPING ASSY VPH 24-22 MOV
MAT. DUE | APP'D
B/U REQ.
B/U COMP | USED ON

DRAWING NO.

REF	SIZE	PART NO.	REV
—	P	062400	

SHEET 7 OF 7

FORM FB-A 1 JUL 75

ITEM NO.	MFG	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
1		T062300	SHIPPING ASS'Y, VPH15-31 OV		—	—		
5	E		SCHEMATIC, OV	T011879	REF	—		
9	B	PD025655	ASS'Y., TOP COVER & LABEL		1	2		
10	C	065613	COVER, FINISHED		1	2		
11		065148	AC COVER		1	2		
12		860181	ROUND SPACERS		2	1		
13		T101040	NAMEPLATE		1	R		
15		840405	PLUG BUTTON		1	R		
17	B	PD024996	ASS'Y., CHASSIS # 1		1	2		
18	C	065608	CHASSIS, FINISHED		1	2		
19	E							
21		840192	FEET, RUBBER		4	1		
22		T971020	1/4 - 20 x 1 1/4 HEX BOLT		2	1		
23		320334	CAPACITOR, 12,000 MF, 40V	C105, 106, 108	3	1		
25		820274	↓ , 6000 MF, 40V	C107	1	1		
27		106664	FAN	B101	1	1		
29		106879	CLAMP, CAPACITOR		1	1		
31		100725	↓		1	1		
33	C	065612	↓		1	2		

REVISIONS
DESCRIPTION
A CHANGE PER ECO 15147 1-23-80
B CHANGE PER ECO 15356 3-20-80

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDENT
				52542

PLANNER | PREP DATE 10-22-75 | CHK'D | APP'D | MAT. DUE | B/U REQ. | B/U COMP

SYSTRON DONNER CORPORATION

SHIPPING ASS'Y

VPH15-31MOV

DRAWING NO.

REF	SIZE	PART NO.	REV
—	P	T062300	B

ITEM NO.	SIZE	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
		PD024996	ASS'Y., CHASSIS #1		—	—		
34		T910110	GROMMET		1	R		
35	C	065609	BRKT, MTG., XFMR & CHOKE		1	2		
36								
37		PD025645	ASSLY, HEAT SINK		1	2		
38		640020	RES. .2Ω 3W	R101	1	1		
39		101467	1K 1/2W	R103	1	1		
40		101498	100Ω 1/2W	R114	1	1		
41	A							
42	C	118982	HEATSINK, ADDITION #1		1	2		
43		705071	TRANSISTOR	Q101	1	1		
44		700196	↓	Q103	1	1		
45		830101	SOCKET, TRANSISTOR		1	1		
46		830103	↓ ↓		1	1		
47		T990290	WASHER, MICA		1	R		
48		T990285	↓ ↓		1	R		
49		859019	STRIP, TERMINAL		1	1		
50		065614	BAFFLE			1	2	
51	C	119112	PLATE, FAN, RIGHT		1	1		
52	C	119122	↓ , ↓ , LEFT		1	1		
53		T950174	INSULATION, RUBBER		1	R		
54		T910010	GROMMET, 3/16		1	R		
55	A	PD025634	ASS'Y., PANEL REAR		1	2		
56	A	065611	REAR PANEL		1	2		
57		117377	HOLDER, FUSE		1	1		
58		870212	FUSE, 15A, 250V	F1	1	1		
59		850150	STRIP, BARRIER	TB1	1	1		
60		118242	BLOCK, INSULATOR	TB2	1	1		
61		850052	STRIP, BARRIER	TB3	1	1		
62		840217	LINK, BARRIER STRIP		1	1		
63		PD025652	ASSY, CHASSIS		1	2		
64		800304	CAP. 1μF 250V		2	1		
65		504179	TRANSFORMER	T101	1	1		

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDENT
				52542

PLANNER	PREP DATE	SYSTRON DONNER CORPORATION
	10-23-75	
	CHK'D	SHIPPING ASS'Y
MAT. DUE	APP'D	VPH 15-31MOV
B.U REQ.		DRAWING NO.
B.U COMP	USED ON	REF — SIZE P PART NO. T062300 REV
		SHEET 2 OF 8

	ITEM NO.	SIZE	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
			PD025652 (CONT)	ASS'Y., CHASSIS #2		-	-		
+	66		710454	DIODE IN5401	CR101 & 102	2	1		
	67		504177	CHOKE	L101	1	2		
	68	B	118222	BAR, BUSS, POS. OUTPUT		1	2		
	69	C	118232	BAR, BUSS, NEG. OUTPUT		1	2		
	70	B	118292	SHUNT		1	2		
+	71		800185	CKP. .1μF	C101 & 102	2	1		
	72	A	PD025651	ASS'Y., FRONT PANEL		1	2		
	73	C	118284	FRONT PANEL, FINISH		1	2		
						1			
✳	75		06516601	METER, 0-50 A	M101	1	R		
✳	76		06517002	METER, 0-20V	M102	1	R		
	77		880611	SWITCH	S101	1	1		
	78		770090	L.E.D.	DS101	1	1		
	79		600188	RESISTOR, VADJ, 1.5K, 2W	R116	1	1		
	80		840220	SHAFTLOCK		1	1		
	81	B	PD025649	ASS'Y., HEATSINK .0V		1	2		
	82	D	T115802	HEATSINK, FAB.		1	2		
	84	A		ASS'Y., HEATSINK #3	PD025647	REF	-		
	86	B	065444	BRKT, P.C, SUPPORT		2	2		
+	87		640190	RES. 10Ω 2W	R115	1	1		
+	88		630022	.2 Ω 5W	R104-R113	10	1		
	90	C	118602	BAR, BUSS, EMITTER		1	2		
	92	C	118992	HEAT-SINK		1	2		
	94		T990415	NUT, PUSH, NYLON		3	R		
	95		T990450	P.C. SUPPORT		4	1		
	96								
	97		T990405	NUT, PUSH, NYLON		2	R		

REVISIONS DESCRIPTION REV

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDENT 52542
PLANNER	PREP DATE		SYSTRON DONNER CORPORATION	
	CHK'D		SHIPPING ASSY	
MAT. DUE	APP'D		VPH 15-31Mov	
B/U REQ.			DRAWING NO.	
			REF SIZE PART NO.	REV
B/U COMP			— P T062300	
	USED ON		SHEET 3 OF 8	

ITEM NO.	SIZE	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
		PD025649 (CONT)	ASS'Y., HEATSINK.OV		—	—		
99		T960347	RIVET		4	R		
01		705071	TRANSISTOR,	Q104-113	10	1		
03		720132	DIODE	CR108	1	1		
05		720129	↓	CR107	1	1		
07		720335	IN1184A	CR103 & 104	2	1		
09		830101	SOCKET, TRANSISTOR		10	1		
11		T990350	RING, INSULATOR		1	R		
13		T990307	WASHER, MICA		2	R		
15		T960085	LUG, SOLDER		1	R		
17		880003	SWITCH, THERMAL	S102	1	1		
19								
21		720008	DIODE - SCR		1	1		
23		T990340	RING, INSULATOR		3	R		
25		T990295	WASHER, MICA		2	R		
27		T960640	LUG		1	R		
29	A							

DESCRIPTION

REV

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDENT
				52542

PLANNER	PREP DATE	SYSTRON DONNER CORPORATION
	10-23-75	
	CHK'D	SHIPPING ASS'Y
MAT. DUE	APP'D	VPH 15-31 MOV
B/U REQ.		DRAWING NO.
B/U COMP		REF — SIZE P PART NO. 7062300 REV
	USED ON	SHEET 4 OF 8

ITEM NO.	SIZE	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
		PD025652 (CONT)	ASS'Y., CHASSIS #2		—	—		
131	B	122852	STRIP, OUTPUT HOLDING		1	2		
133	C	PD025648	ASS'Y., COMP. BD.		1	2		
135	D	T112256	FAB., P.C.B		1	2		
137		T960464	TERMINAL		16	R		
138		543131	↓ RIGHT ANGLE		16	R		
141		102598	CAPACITOR, 100μF, 50V	C1	1	1		
143		800090	.01μF, 600V	C3	2	1		
144		800002	470pF, ↓	C4	1	1		
145		810060	35μF, 25V	C5	2	1		
146			S/AC5	C6				
147		100134	.05μF, 200V	C7	1	1		
148			S/AC3	C8				
149		100178	.1μF, 100V	C9	1	1		
151		821006	68μF, 15V	C11	1	1		
152		100063	10μF 25V	C12	1	1		
153		821007	68μF ↓	C13	1	1		
155		100413	DIODE, IN5395	CR1	6	1		
156			S/A CR1	CR2				
157		720410	IN4741A	CR3	1	1		
158		100387	IN753A	CR4	1	1		
159		720167	IN757A	CR5	1	1		
160			S/A CR1	CR6				
161			S/A CR6	CR7				

REVISIONS
DESCRIPTION

KEY

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDENT
				52542

PLANNER | PREP DATE 10-23-75 | CHK'D | APP'D | MAT. DUE | B/U REQ. | B/U COMP | USED ON

SYSTRON DONNER CORPORATION

SHIPPING ASS'Y

VPH 15-31 Mov

DRAWING NO.

REF	SIZE	PART NO.	REV
—	P	T062300	

SHEET 5 OF 8

ITEM NO.	SIZE	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
		P002564 8 (CONT)	ASS'Y., COMP. B D.		—	—		
63		100378	DIODE, IN751A	CR8	2	1		
64		741001	UN-SW 2N4990	CR9	1	1		
65			S/A CR8	CR10				
66		720440	IN4148	CR11	1	1		
67			S/A CR6	CR12				
68			↓ ↓ ↓	CR13				
70		025756	I C.	A1	1	1		
72		106587	TRANSISTOR, 2N2219A	Q1	1	1		
74		640440	RESISTOR, 470Ω, 2W, 10%	R1	1	1		
75								
76		600207	POT, 2K, ½W, 20%	R3	1	1		
77		620436	2.26K, ½W, 1%	R4	1	1		
78		620612	7.87K,	R5	1	1		
79		620534	4.64K,	R6	1	1		
80		620402	1.96K,	R7	1	1		
81		106012	2.2Ω, 10%	R8	2	1		
84		117188	POT, 100Ω, ½W, 20%	R11	4	1		
85		101454	2.2K, ½W, 10%	R12	1	1		
86		10163	560Ω, ↓ ↓	R13	1	1		
87			S/A R8	R14				
88		630450	2.5K, 3W, 3%	R15	1	1		
89			S/A R11	R16				
90		640300	50Ω, 10W	R17	2	1		
91			S/A R17	R18				
92		640290	50Ω, 3W, 3%	R19	1	1		
93		640190	10Ω, 2W,	R20	1	1		

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDENT
				52542

PLANNER	PREP DATE	SYSTRON DONNER CORPORATION
	4-10-72	
	CHK'D	SHIPPING ASS'Y
MAT. DUE	APP'D	VPH 15-31M0V
B/U REQ.		DRAWING NO.
S/U COMP		REF SIZE PART NO. REV
		— P T062300
		SHEET 6 OF 8

DESCRIPTION

REV

ITEM NO.	SIZE	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
		PD025648 (CONT)	ASS'Y., COMP. BD.		—	—		
194			RESISTOR, S/A R11	R21				
195		101459	1.5K, ½W, 10%	R22	1	1		
196		101467	1K, ↓ ↓	R23	2	1		
197			S/A R11	R24				
198		640490	680Ω, 2W, 10%	R25	1	1		
200		101511	4.7K, ½W, 10%	R27	2	1		
201		101510	6.8K, ↓ ↓	R28	1	1		
202			S/A R23	R29				
203		101665	220Ω, ½W, 10%	R30	1	1		
204			S/A R27	R31				
206		840422	PAD IC		1	R		
207		840411	, TRANSISTOR		1	R		
208		840420	, ↓		1	R		
210A			WIRING, T101 & L101	PD025640	REF	—		
212A			, REAR CHASSIS	PD024637	REF	—		
214A			, FRONT PANEL	PD025654	REF	—		
216A			, PCB	PD025642	REF	—		
218A			, HEAT SINK	PD025646	REF	—		
219B			. ↓	PD025650	REF	—		
220B			, CHASSIS	PD025653	REF	—		

REVISIONS DESCRIPTION

REV

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDENT
				52542

PLANNER	PREP DATE	SYSTRON DONNER CORPORATION
	CHK'D	SHIPPING ASS'Y
MAT. DUE	APP'D	VPH 15-31 MOV
B/U REQ.		DRAWING NO.
B/U COMP		REF — SIZE P PART NO. T062300 REV
	USED ON	SHEET 7 OF 8

*

ITEM NO.	SIZE	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT. CODE	ISS. QTY	SHT QTY
		T062300 (CONT)	SHIPPING ASSY		—	—		
227		PD0249901 01	#ARNESS AC/DC		1	2		
229		PD024630	WIRE LIST		1	2		
231		PD0270901 01	#ARNESS DC		1	2		
233		PD027092	WIRE LIST		1	2		
235		PD025644	WIRE LIST -JUMPERS		1	2		
240A		06516601	METER ASS'Y 0-50A	M101	1	2		
241B		065160	METER MVMT 1ma 77Ω		1	1		
242		117397	DIAL, BLANK	B 065166	1	1		
243B		06517002	METER ASS'Y 0-20V	M102	1	2		
244B		065160	METER MVMT 1ma 77Ω		1	1		
245		117397	DIAL, BLANK	B 065170	1	1		
246		065049	P.C. BOARD		1	1		
247		117123	POT 1T WW 2K	R401	1	1		
248		117126	RES 19.1K	R402	1	1		
249		103862	HEX NUT		2	1		

REVISIONS
REV | DESCRIPTION

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDENT
				52542

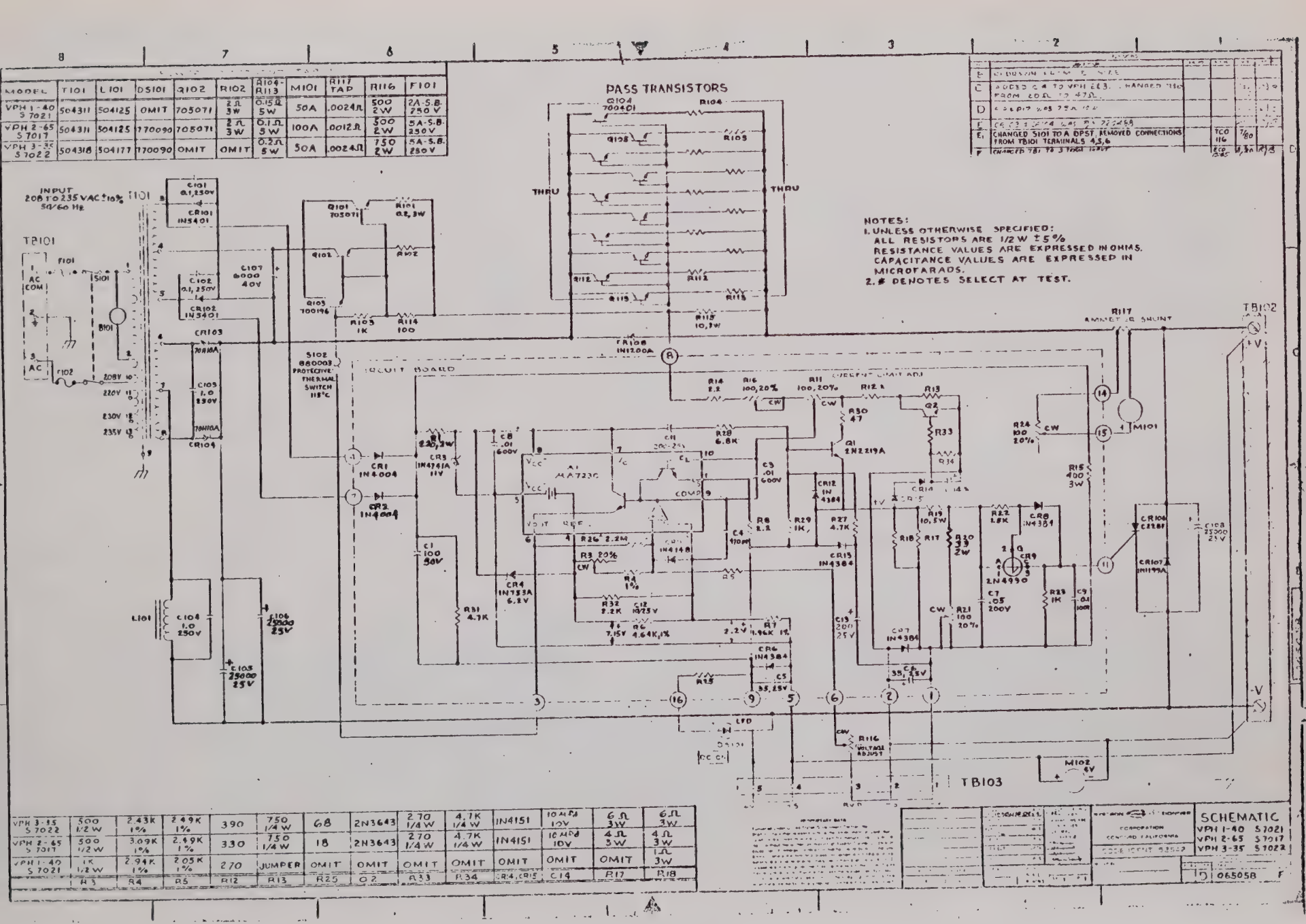
PLANNER | PREP DATE | CHK'D | APP'D | MAT. DUE | B/U REQ. | B/U COMP | USED ON

SYSTRON DONNER CORPORATION

SHIPPING ASSY
VPH15-3/MOV

DRAWING NO.
SIZE | PART NO. | REV
— | P T062300 |

SHEET 8 OF 8



MODEL	T101	L101	DS101	Q102	R102	A104-A113	M101	R117 TAP	R116	F101
VPH 1-40 S 7021	504311	504125	OMIT	705071	2Ω 3W	0.15Ω 5W	50A	.0024Ω	500 2W	2A-S.B. 250V
VPH 2-65 S 7017	504311	504125	1700090	705071	2Ω 3W	0.1Ω 5W	100A	.0012Ω	500 2W	5A-S.B. 250V
VPH 3-35 S 7022	504318	504177	1700090	OMIT	OMIT	0.2Ω 5W	50A	.0024Ω	750 2W	5A-S.B. 250V

VPH 3-45 S 7022	500 1/2 W	2.43K 1%	2.49K 1%	390	750 1/4 W	68	2N3643	2.70 1/4 W	4.7K 1/4 W	IN4151	10 MEG 10V	6Ω 3W	6Ω 3W
VPH 2-65 S 7017	500 1/2 W	3.09K 1%	2.49K 1%	330	750 1/4 W	18	2N3643	2.70 1/4 W	4.7K 1/4 W	IN4151	10 MEG 10V	4Ω 3W	4Ω 3W
VPH 1-40 S 7021	1K 1/2 W	2.94K 1%	2.05K 1%	270	JUMPER	OMIT	OMIT	OMIT	OMIT	OMIT	OMIT	OMIT	1Ω 3W
	R3	R4	R5	R12	R13	R25	Q2	R33	R34	CR4, CR15	C14	R17	R18

REVISIONS					
REV	DESCRIPTION	ENG NO.	ECO NO.	DATE	APP BY
D	REDRAWN FROM 'E' SIZE			6/80	RB
E	CHANGED S101 TO A DPST, ADDED F102		15171	9/80	AB

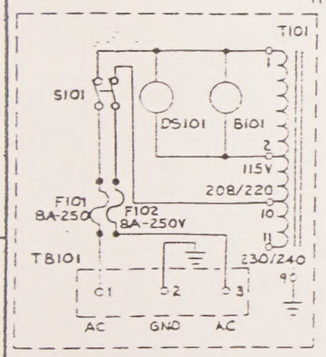
PASS TRANSISTORS

NOTES:
1) UNLESS OTHERWISE SPECIFIED.
ALL RESISTORS ARE ½W, ±5%
RESISTANCE VALUES ARE IN OHMS
CAPACITANCE VALUES ARE IN MICROFARADS
2) ALL MODELS ARE SHOWN WITH
OVER VOLTAGE PROTECTION
TO DELETE, OMIT CR106, R19 THRU R23, C7, C9, CR9
3) * DENOTES SELECT AT TEST

INPUT
105 TO 132 VAC
57 TO 63 Hz

C101 0.1, 250V
T101
CR101 IN5401
C102 0.1, 250V
CR102 IN5401
C107 6000 40V
720468 CR103
C109 .22 250V
C103 1.0 250V
CR104 720488
C110 .22 250V
TB101
F101 (SLO-BLO) 15A, 250V
S101
B101
Q101 700085
R101 0.47, 2W
Q103 ZN3738
R103 1K
R114 100
Q104 700088
R104 0.1, 1%, 5W
THRU
Q107
R107
Q108
R108
Q110
R110
Q111
R111
Q112
R112
R115 10, 2W
CR109 IN5395
CR108 IN1200A
S102 880003 PROTECTIVE THERMAL SWITCH 115°C
CIRCUIT BOARD
R117 .0033 AMMETER SHUNT
TB102
+V
-V
CR1 IN5395
CR2 IN5395
R1 470, 2W
CR3 IN4741A 11V
C8 .01 600V
A1 LM723C
C11 68-15V
R28 6.8K
R14 2.2
R16 100, 20%
R11 100, 20%
CURRENT LIMIT ADJUST R12*
R30 220
CR5 IN758A 10A
R13
Q1 2N2219A
R24 100 20% CW
M101 30A
R15 2.5K 3W
C3 .01 600V
CR12 IN 5395
R19 200, 5W
R22 1.5K
R27 4.7K
CR13 IN5395
R8 2.2
R29 1K
C4 470PF
R26, *2.2K
R3, 2000, 20% CW
CR11 IN5395
R4 2.26K, 1%
R32 2.2K
C12 10-25V
R6 4.64K, 1%
Z 15V
2.2V
R7 1.96, 1%
CR6 IN5395
R25
C5
35-25V
C6
C1 100 50V
CR4 IN753A 6.2V
R31 4.7K
R5
C10 2-50V
C13 50 50V
CR7 IN5395
R18 250 10W
R17 250 10W
R20 47 2W
CR9 2N4990
C7 .05 200V
R23 1K
C9 0.1 100V
R21 100 20% CW
CR106 C228F
C108 6300 75V
CR107 IN1200A
L101 504127
C104 1.0 250V
C106 6300 75V
C105 6300 75V
R118 2K, 5W
CR10 IN751A 5.1V
R2 JUMPER
LED DS101 DC ON
R116 VOLTAGE ADJUST
TB103
+V +S RVP -S -V
R402 CW
R401
M102

208V-240V POWER TABLE	
MODEL	T101
VPH 24-22	504182
VPH 28-19	504355



MODEL	T104	R116	R5	R12	R13	R25
VPH 24-22	504137	2K, 2W	12.4K, 1%	3.3K	4.7K	1K, 2W
VPH 28-19	504126	2.5K, 2W	13.7K, 1%	4.7K	10K	1.8K, 2W

COMPONENT TABLE

PROPRIETARY DATA

ITEM NO.	QTY	PART NUMBER	DESCRIPTION	SCHEMATIC REF NO.

LIST OF MATERIALS

DRAWN	B 6/80 DATE	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES DECIMAL TOLERANCE .X ±.1 .XX ±.01 ANGLES ±1°	SYSTRON DONNER CORPORATION CONCORD CALIFORNIA
CHK'D	DATE		CODE IDENT 52542
ELECT	DATE		SCHEMATIC VPH
MECH	DATE		
PROJECT	DATE		
QA	DATE		
VPH28-19			
VPH24-22			
USED ON	NEXT ASSY		
APPLICATION			
SCALE	DO NOT SCALE DRAWING	MATERIAL	DRAWING NO. REF SIZE D PART NO. 124820 REV E

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